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A STUDY OF REGIONAL INSTRUCTIONAL MEDIA RESOURCES, PHASE I--MANPOWER.

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A COMPREHENSIVE STUDY OF INSTRUCTIONAL MEDIA MANPOWER REQUIREMENTS AND RELATED PROFESSIONAL EDUCATION PROBLEMS WAS CONDUCTED. THE SPECIFIC OBJECTIVES WERE (1) TO ESTABLISH A JOB CLASSIFICATION SYSTEM FOR MEDIA SERVICES, (2) TO SUGGEST DIMENSIONS FOR FUTURE STUDIES OF MANPOWER REQUIREMENTS FOR MEDIA SERVICES, (3) TO SPELL OUT PROCEDURES FOR OTHER SIMILAR STUDIES, AND (4) TO SUGGEST DATA WHICH COULD BE GATHERED TO CONTRIBUTE TOWARD THE DEVELOPMENT OF EDUCATIONAL OBJECTIVES, CURRICULUM, AND TRAINING MATERIALS FOR PERSONS WORKING IN ANY OF THE MEDIA FIELD SPECIALITIES. PROCEDURES INCLUDED COMBINING THE TECHNIQUES OF FUNCTIONAL JOB ANALYSIS AND THE CRITICAL INCIDENT TECHNIQUE TO PROVIDE (1) QUANTITATIVE INDICATORS FOR GROUPING MEDIA JOBS ACCORDING TO AREAS OF PERFORMANCE OR CAPABILITY, INTERESTS, AND SATISFACTIONS AND (2) SOME QUALITATIVE DIMENSIONS FOR CLASSIFYING EDUCATIONAL REQUIREMENTS FOR THE OCCUPATIONAL GROUPS DERIVED. A COMPUTER-BASED MULTIVARIATE STATISTICAL ANALYZER SYSTEM WAS ADOPTED FOR "FINDING" THE RELEVANT OCCUPATIONAL GROUPS AND RELEVANT VARIABLES. THE MULTIDIMENSIONAL PERFORMANCE SPACE OBTAINED PROVIDES A WAY OF VIEWING THE CHANGES TAKING PLACE IN JOBS. FINDINGS REVEALED--(1) AS MORE TECHNOLOGICAL CHANGES OCCUR IN INSTRUCTIONAL SERVICES TO SCHOOLS AND COLLEGES, THE RELATIONSHIP BETWEEN OCCUPATIONS IN DISCRETE WORK FIELDS IS EXPECTED TO DIMINISH, (2) THAT SEVERAL DIFFERENT JOBS EXIST TO ACCOMPLISH THE SAME FUNCTIONAL TASKS, AND (3) A WHOLE NEW RANGE OF JOBS, EACH ASSOCIATED WITH PARTICULAR SKILLS AND KNOWLEDGES HAS BEEN IDENTIFIED -- EDUCATIONAL TECHNICIANS, EDUCATIONAL SPECIALISTS, EDUCATIONAL COMMUNICATIONS SPECIALISTS, AND EDUCATIONAL MANAGERS. (HB)

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A STUDY OF REGIONAL INSTRUCTIONAL MEDIA RESOURCES

PHASE I - MANPOWER

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A STUDY OF REGIONAL INSTRUCTIONAL MEDIA RESOURCES

Phase I - Manpower

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CHANGING PATTERNS OF JOB
REQUIREMENTS FOR MEDIA
SERVICE PERSONNEL
(in Schools and Colleges)

ABSTRACT

This study of instructional media manpower needs combined the techniques of Functional Job Analysis (FJA) and Critical Incident Technique (CIT) to provide (1) some quantitative indicators (FJA variables interest variables and job incentive variables) for grouping media jobs according to areas of performance or capability, interests and satisfactions and (2) some qualitative dimensions (CIT categories) for classifying educational requirements for the occupational groups derived. A computer-based multivariate statistical analyzer system was adopted for "finding" the relevant occupational groups and relevant variables. √The multidimensional performance space obtained provides a way of viewing the changes taking place in jobs.

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I. INTRODUCTION

A. The Problem

The changes brought about in education through newer instructional media methods and techniques (e.g., television, audiovisual, computer, language laboratories, etc.) are universal, but often overlooked. Prior to World War II many of these newer instructional media were not yet in existence; today most of the larger school systems and colleges throughout the country offer some portion of their instruction via these methods. The use of newer media for education has developed parallel with research on the science and art of teaching.

The science and methodology of instructional technology as it is being developed has influenced methods of teaching in all programs and areas of education. Analysis of educational objectives precedes the development of most materials and systems of materials; instructional research discovers and continues to develop new media and means of communicating knowledge unknown a decade ago; these in turn allow men to experiment with the instructional environment, explore the conditions optimal for learning and investigate ways and means of improving individualization of instruction. Instructional media and their use have shifted instruction to a considerable extent during the past ten years from the printed page to electronically presented image and sound.

Information presentation leading to knowledge acquisition has been influenced by methods of "programming", coming from behavioristic psychology. The aural-oral method inseparable from electronic language laboratories offers a whole new approach to the teaching of languages. Developments in video tape recordings and transmission devices facilitate the distribution and utilization of instructional television. Among the newer technologies the development of a computer-based learning laboratory stands out as an example of a multi-media approach to instruction and education, providing a variety of input information and output testing in addition to serving administrative needs of information storage, guidance and planning.

As new media have been introduced into the educational system, problems have arisen. The new technology has created many new responsibilities and concerns for new types of educational personnel. For example: (1) The use of AV media, particularly television, for classroom instruction has placed considerable responsibility for "quality" instruction on communications specialists; and, (2) The development of individualized learning media or "programmed" instruction has placed similar responsibilities on learning research and development scientists. In addition we find that the rapid production of films, recordings and other audiovisual materials has prompted new systems for indexing and evaluating materials while attempts at the total integration of media into the education program have been responsible for new approaches to systems analysis and systems communication development.

Before instructional media can be used effectively within education, sufficient numbers of skilled and qualified individuals must be made available to meet the requirements of the new tasks presently being created. Media personnel with well defined job functions and professional training are needed.

The development, i.e., the education and training of media personnel, is contingent, however, upon the following important factor. Delineation of jobs and training for instructional media personnel must take into account the major deficiency in the historical development of instructional media. This is a lack of knowledge and theory to guide media practice and to aid in determining which media are best used in which situation (considering the nature of the school setting, the student's ability and the skill to be taught). Until such time as principles, methods, concepts and technologies for the instructional media field are more clearly and definitively defined, education and training needs for professional types of personnel cannot be determined fully or realistically.

Media personnel are not presently available in any great numbers. Gross estimates of need indicate that at least 50 percent of our school systems and colleges are without the services of full-time instructional media personnel. Specifically, what is needed is a team of individuals who are trained not only for production and utilization of needed materials and for aiding teachers for the improvement of instruction, using newer media, but also for the areas of administration and research. This team would consist of instructional media administrators and specialists (e.g., production, distribution, research) assisted by technical personnel.

One solution to the manpower development problem in education, as in other fields, is to regroup tasks and responsibilities (actual and anticipated) for the media field and then cluster these tasks into job requirements for needed additional personnel. This solution suggests the use of a new approach to management of manpower studies which involves defining classes of jobs in terms of current and potential personnel needs as developed by Fine and Martin. This approach has been used in several fields of work (Fine, 1963, 1964) and (Levin and Martin, 1963) to determine the changes necessary in job descriptions and job training with changes and expansions due to advancing technology. Theoretical and analytical considerations that form the basis for this approach are given in Appendix A.

B. The Present Study

In June of 1963, the University of Pittsburgh entered into a series of discussions with the staff of the Media Branch of the U. S. Office of Education concerning the need for making a comprehensive study of instructional media manpower requirements and related professional education problems. While such a study might be conducted on a national basis, it was believed feasible to limit the study to a regional area, such as western Pennsylvania, and to study the media field within the framework of western Pennsylvania's changing educational, social, and economic conditions. Typical national problems confronting instructional media would arise in this rapidly changing industrial area. It was anticipated that evidence would be gathered from outside the region to insure some degree of representativeness and for comparative purposes.

The findings of this study would (1) establish a media job classification system for media services, (2) suggest dimensions for future studies of manpower requirements for media services, (3) spell out procedures for other similar studies and (4) suggest data which could be gathered to contribute toward the development of educational objectives, curricula, and training materials for persons to work in any of the media field specialties.

C. Assumptions Made

In brief, the present study is based on the following assumptions:

1. Media resources and services must be viewed in the context of the education system in which they will function and exist.

2. Media resources and services are becoming increasingly the responsibility of the education system including the state departments of government.

3. Integration of media services and library services will increase.

4. Rapid developments in instructional technology are changing the role and function of all education personnel requiring the continuous evaluation of functions to be performed.

5. Education and training of media personnel must be modified in response to the particular services to be provided.

6. Educators and teachers as well as those entering schools of education and library service must be taught how to appreciate and understand the contribution media can make.

II. PROCEDURES FOLLOWED

The following section of this report describes the procedures used in selecting individual respondents from media service personnel in school systems, colleges and universities and the instruments used for gathering data. The reasons for choosing these procedures and instruments are also given.

A. Rationale

The major practical objective of the study is to determine how to provide reliable information on which administrators and educators can base decisions concerning the design of jobs and the education and training of personnel for instructional media services and programs. This information will not be presented in the form of normative or census data providing enumerative sets of statistics for each and every class of instructional media personnel. The intent is rather to provide types of data useful in answering questions concerning the actual and anticipated occupational structure of the media field and the demand for particular human skills.

To achieve the above it was decided that strict random sampling of instructional media personnel was not necessary nor would it prove feasible since instructional media service occupations are not well defined and a high degree of unrealiability would be present were the individual to serve as a unit for sampling.

Another respect in which such a procedure would not be fruitful relates to the fact that such a sampling approach would actually provide more cases representing one area of specialization and less of others than would be maximally efficient. It did seem desirable to include a variety of schools, colleges and organizations to provide representative findings as to media, field requirements and patterns of service. For that reason, our sampling procedures selected organizations and then personnel.

The design necessitated drawing from personnel within organizations at differing levels of responsibility and engaged in differing work functions. It also necessitated selecting personnel engaged in a variety of work fields chosen a priori to represent the instructional media service occupations. The work functions included are as follows: administration, supervision, research and development, production, distribution, teaching for the use of media and assisting. The work fields included are as follows: computer-based learning environments, electronic learning centers (language laboratories), educational television, audiovisual aids, printed materials, and programmed instruction. Certain educational personnel whose primary function was teaching and thus whose primary work field was a subject matter specialty (e.g., math, science, foreign language, etc.) were then included proportionately to provide a more complete picture of the changes in job activities due to the integration of media into the teaching-learning situation.

Private and parochial schools were eliminated early in planning the study to minimize the number of external variables to be considered: junior colleges and extension campuses were also excluded.

B. Selection of School Systems, Colleges and Universities

There are 369 operating school districts in the 23 counties defined as forming the "western Pennsylvania" region. From this universe a sample of 72 school districts was chosen. Several school systems in West Virginia and Ohio were included for the purpose of obtaining information on variations that occur when state boundaries are crossed. (A more detailed description of the sampling procedures is given in Appendix B-1).

The list of school districts was then discussed with members of University of Pittsburgh faculty familiar with schools in western Pennsylvania. Four additional school systems in Allegheny County were recommended and included as prototypic districts because of their media service programs. These are Mt. Lebanon School District, Baldwin Township School District (including the Oakleaf Elementary experimental school), North Hills Joint School System and Hickory Township School System. Three of the school districts are in Allegheny County while the fourth is in Mercer County. The relative size and per pupil expenditure for each school district chosen may be obtained from Appendix B-2.

There are 28 colleges and universities in the region of study. From this universe a sample of nine colleges and two universities was chosen. (See Appendix B-1). Three of the colleges are state-controlled while six are private.

C. Selection of Additional Media Agencies in the Region

Additional agencies providing specialized services to schools and colleges in the region were then selected. The agencies chosen represent the full complement of organized media services that exist in the region. These agencies include: A community-owned educational television station, a regional public library, and three regional instructional materials centers.

D. Selection of Prototypic (Out-of-the-Region) Types of Employers and Media Settings

A prototypic (out-of-the-region) sample of types of employers and media settings, comparable in terms of work functions and work fields with the above sample within the region of study, was selected with the aid of an advisory group. Appendix B-2 contains the final listing of types of employers and media service agencies selected.

It may be noted that the prototypic sample contains a large proportion of university and college personnel while the representative sample is more heavily loaded with respondents from city and county secondary school systems. This difference is due to the fact that the samples were drawn for two different purposes. The Representative sample was drawn to obtain data concerning the actual situation of visual communications media utilization in the region of study while the purpose of the Prototypic sample was to determine the trends in the use of media.

E. Selection of Individuals to Complete Survey Materials

Since a main focus of the study is deployment of instructional media service personnel, it was necessary to include enough different types of specialists to render analysis meaningful. It was found neither possible nor desirable to include only individuals who were identified as full-time instructional media specialists since media activities are often not full time. Such a procedure would make comparison impossible because of the small sample involved. Therefore, it was decided to utilize what was known about media specialists in the organizations selected and eliminate only those personnel for whom involvement in work activities of the media field would be unlikely.

Each media specialist selected represents an individual engaged in full, part-time or occasional professional or technical job activities of a media service nature. Each demonstrates in his job activities knowledges and skills consistent with what is required in the field for differing types and levels of performance.

The instructional media field, as sampled, includes respondents with differing kinds of knowledges and skills and varying degrees of commitment. The present specialists are, as evidence indicates, from varied fields of work (e.g., education, library science, broadcasting, theater arts, psychology, etc.) and have, in most cases, major commitments of time and responsibility to their fields. Thus, within the organizations chosen, the respondents probably represent the functions that are performed in media service occupations to the extent that such can be identified. Difficulties which arose in selecting the sample lay wholly with the amorphous and unstructured status of the instructional media field. The major problem that the study faces is how to index significant dimensions of media service occupations for the purpose of defining the field and predicting future media functions to be performed.

In practice, a "chunk" sample of respondents was chosen from each organization (e.g., school district, college, media agency and university) in an informal manner selecting at least one individual to represent each level and type of media activity. Appendix C identifies the job titles of those included in the sample.

F. Instruments Used and Data Collected

The techniques used in the course of the study are outlined below: (1) Functional Job Analysis (FJA) - a method separating jobs according to functional activities; (2) Critical Incident Techniques (CIT) - a method providing performance requirements for a field of work; (3) Strong Vocational Interest Blank (SVIB) and (4) a Job Incentive Scale to obtain measures of personal attributes which would then be related to FJA analysis; (5) Interviews with "experts" and knowledgeable people in the field to supplement and validate the job analysis information and permit "educated" guesses as to future needs; and (6) Observations of media service arrangements and programs to provide researchers with first-hand information necessary for reviewing present activities relative to anticipated organization changes.

A self-report schedule of job tasks, classified according to predetermined FJA categories, was developed as a result of interviews and observations of media service personnel in their respective settings. This instrument was part of the functional job analysis. Previous manpower research studies served as the major basis for deciding which functional areas of jobs to introduce into the self report.

Three measures were combined with the FJA schedule into a single questionnaire called Job Activities Schedule. (See Appendix D for a copy of this instrument). These were a biographical information scale, a job incentive scale and critical incidents scale. (The latter two are mentioned above). Together, these four measures and the Strong Vocational Interest Blank, provide the major bulk of quantitative and qualitative data for the study.

Arrangements were made with the selected schools, colleges, and other study organizations for the administration of the final survey materials, i.e., Job Activities Schedule and SVIB. To the extent possible, each organization was visited by one of our staff members and directions for completing the forms were discussed. Observations made during the course of each visit on the characteristics of the organization and its media services were summarized and recorded. The transmittal letters and forms used for recording the characteristics of the schools and colleges visited are included in Appendix E-1 and E-2.

III. RESULTS AND DISCUSSION

A. The "Logical" Problem of Classifying Jobs

The major problem to be solved by the study is the development of a criteria for clustering media jobs, i.e., a media job classification system. The logical problem of separating similar kinds of tasks into exact job descriptions is a difficult one at best. The following rules, which initially were derived judgmentally from the functional job analysis categories, were chosen as definitive criteria for the formulation of the "logical" job clusters. These rules were tested by computer grouping (Ward, 1962) of the FJA categories; the process reconfirmed the relevant categories to be used. The rules developed for a priori grouping of jobs analyzed are as follows:

1. Similar types of jobs must be relatively homogenous with respect to what the worker does (i.e., some major FJA categories for the media field would include operating equipment (e.g., operating complex scanning and monitoring equipment), negotiating (e.g., formulating major policy and operations decisions), etc.
2. Similar types of jobs must be relatively homogenous with respect to educational preparation (i.e., major categories would include formal education, on-the-job training, job experience, etc.)
3. Similar types of jobs at the technologist or technician level must be relatively homogenous with respect to the materials worked with or the equipment used: (i.e., some major categories for the media field would include AV, TV, computers, printed materials, etc.)

Using these criteria, types of jobs for the media field were arrived at which seemed relatively consistent with the general level of the jobs (i.e., complexity of the job as represented by level of responsibility), the content of the jobs (i.e., production of materials, technical work with equipment, advising and consultation, etc.) and the characteristics of the organizations (i.e., television stations, regional instructional materials centers, libraries, etc.) relevant to each group. As a result, the following 14 types of jobs were formulated (See Chart 1).

CHART 1

Types of Jobs for the Media Field*

	Functional Area	Occupational Group Identification	Jobs
Group 1	Administration of Media	Administrator (Media)	Manager, Closed Circuit TV Director of the Library Director of Audiovisual Services
Group 2	Supervision of Curriculum/ Development of Media	Supervisor of Curriculum/ Instructional Materials	Supervisor, Sec. School Librarian Curriculum Supervisor Director of Instructional Material
Group 3	Teaching for the Use of Media	College or University Teacher	Assistant Professor of Education Associate Professor and Director of ETV Art Director
Group 4	Research and Development of Media	Research Specialist	Coordinator of Research Development Learning Research Specialist Head, Information Retrieval Research
Group 5	Television Production	Media Production Specialist (TV)	TV Director-Producer Supervisor, AV Services Area Coordinator, TV Production
Group 6	Audiovisual Production	Media Production Specialist (AV)	Photographer Graphic Artist Visual Communications Specialist
Group 7	Distribution/Production of Media	Instructional Media Specialist (IMS)	AV Coordinator Director, IMC AV Consultant
Group 8	Distribution of Printed Materials	Librarian (Lib)	Librarian Film Librarian Teacher - Librarian

*/indicates and/or

CHART 1

Types of Jobs for the Media Field (Con't.)

	Functional Area	Occupational Group Identification	Jobs
Group 9	Distribution/Computers	Computer Specialist (Comp.)	Computer Operator Senior Computer Operator Computer Programmer
Group 10	Distribution/Audio or Video Transmission	Engineer (AV or TV)	Engineer in Educational TV Engineering Supervisor Transmitter Engineer Videotape Supervisor Sound Engineer
Group 11	Utilization of Media	Television Teacher (School or College)	TV Consultant TV Teacher
Group 12	Utilization of Media	Teacher (School or College)	Elementary Teacher High School Teacher Teacher, Science
Group 13	Utilization/Distribution/ Production of Media	Teacher-AV Coordinator	Teacher-AV Coordinator Teacher-Visual Aids Director Assistant Prof.-Language Lab. Director
Group 14	Assisting in the Use of Media	Clerical and Technical Assistants	Data Control Coder Language Laboratory Attendant Senior Clerk Equipment Technician, Senior Projectionist Laboratory Technician Clerical Assistant

These groups form the a priori functional groups to be used in further analyses of requirements for the media field. These groups will also form the basis for further identification and delineation of more rational job entities for the media field for later studies. Job titles identified with these groups are given in Appendix F.

B. Quantitative and Qualitative Analyses

This section reports the results of a series of quantitative and qualitative analyses of job activities data from several samples of the original respondents. The quantitative analyses are concerned with validating the FJA Variables used for grouping jobs into major job areas. The job titles associated with these areas will also be identified. The technical aspects of the methodology for developing and validating the FJA indicators will not be discussed in depth in this report but will be referred to later technical publications. In brief, a computer-based multivariate statistical analyzer system was adapted for "finding" and validating the relevant grouping variables, hence occupational groups.

The qualitative analyses are concerned with the nature of the performance requirements for the media field with reference to general education and training objectives. The objectives were derived from analyses of critical incidents provided by respondents. The analyses were performed with the following questions in mind:

(1) On the basis of the functional job analyses can we determine whether a common set of functions characterize work in the media field?

(2) Can we determine what is the new technology involved?

(3) Can we specify some general educational objectives for the range of tasks required by the field?

The analyses reported provide a rough "map" of the types of jobs and their requirements that exist for the instructional media field. The map will permit a rational basis for innovations in jobs and provide a basis for the further study of education and training needs for the job clusters identified.

A subsequent report will be devoted to answering the following additional questions:

(1) What are the present patterns needed for a prototypic sample of media services in western Pennsylvania?

(2) What important factors are to be considered in the design of operations of regional media services?

C. Selected Characteristics of Respondents and Employing Organizations

The results to be reported are based on information received from 87% of the total sample of respondents initially selected. Information on the non-respondents is provided later.

1. Respondents by Type of Organization

The total sample of respondents, N=476, by types of employing organizations is given below in Table 1. The information is listed by Representative (R), i.e., in the western Pennsylvania region and Prototypic (P), i.e., in selected organizations outside of the region.

Table 1

Respondents by Type of Organization and Sample

N=476

Type of Organization	Representative	Prototypic
University	5	51
College	28	25
Regional or County IMC*	3	8
City IMC*	5	0
Board of Education - County	0	7
Board of Education - City	7	33
School Systems: City - Elementary	20	0
School Systems: City - Secondary	41	1
School Systems: County - System Level	16	12
School Systems: County - Elementary	21	10
School Systems: County - Secondary	121	12
ETV, Community Agency	28	12
Public Library	7	2
Special Organization	0	1
Total	302	174

It may be noted that no Prototypic city school system was included in the study. When negotiations to obtain authorization to gather questionnaire data in the city school system originally selected met with failure, there was not sufficient time to attempt to reach an agreement with a substitute. It is assumed that few new types of jobs would have emerged were such data to have been included. City systems may be analyzed separately in a later study to provide additional information on job responsibilities of media personnel.

2. Geographic Distribution of the Prototypic Sample of Organizations

Table 2 lists the geographic distribution of the Prototypic sample of organizations.

---

*IMC - Instructional Materials Center

Table 2

East	3
Midwest	6
South	4
West	5

It can be seen that the Prototypic sites chosen were (to a degree) proportionately distributed throughout the four major geographical regions of the United States.

3. Biographical Information Characteristics of Respondents

Table 3 provides information on some of the more salient biographical information characteristics of the 476 media personnel comprising the total sample used. With respect to educational status, it may be noted that roughly 10% of the Representative sample are performing functions in media occupations with high school (including technical school) degrees; roughly 20% of the Prototypic sample fall in this educational status category. Our observations indicate that personnel at this level perform mainly clerical, secretarial and technical tasks. In general, routine functions in education are more likely to be relinquished to educational assistants and technicians in Prototypic organizations than in Representative where such functions are distributed among professional personnel. Another point of interest is that apparently there are a great many more positions paying salaries over $11,000 available in Prototypic organizations than in Representative. This difference may be indicative of the differences in job organization in the two samples.

Table 3

Biographical Characteristics of Total Sample

Representative N=302

Prototypic N=174

Category	Description	Representative	Prototypic
Age	Under 20	3	0
	20 - 29	43	33
	30 - 34	31	29
	35 - 44	77	56
	45 - 54	70	38
	55 and over	78	18
Sex	Male	147	118
	Female	155	56
Highest Degree Held	Less than High School	1	1
	High School	33	34
	B.A., B.S.	111	56
	M.A., M.S.	142	72
	Ph.D.	15	11
Years Since Last Degree	0 - 2.99	35	28
	3 - 5.99	36	21
	6 - 10.99	66	43
	11 - 20.99	86	51
	21 - 50.99	79	31
Number of Positions Held	One Position	220	135
	Two Positions	82	39
Years in Present Position	0 - 2.99	86	77
	3 - 5.99	58	38
	6 - 10.99	82	34
	11 - 20.99	51	23
	21 - 50.99	25	2
Basic Salary	Under $5,000	44	29
	$ 5,000 - $ 6,999	137	31
	7,000 - 8,999	81	43
	9,000 - 10,999	22	31
	11,000 - 12,999	9	14
	Over $13,000	9	26
Supplement to Salary	None	179	87
	Less than $200	35	18
	$ 200 - $ 499	31	20
	500 - 999	23	12
	1,000 - 1,499	17	13
	1,500 - 1,999	6	7
	Over $2,000	11	17

4. Educational Background of Respondents

What are the relationships between functions performed in a field of work and present educational qualifications? In order to provide some initial information on this question we sought a readily available measure of educational status to be useful for this analysis. The availability of certain indices from our questionnaire led us to utilize the following categories: High School, Technical School, Military Training Program, Baccalaureate (specific to field of study), Master's (specific to field of study), Doctorate (specific to field of study). These categories are utilized in Figure 1, Page 16, to indicate the educational flow into the media field.

It can be seen from Figure 1 that: The flow into this field has been primarily through education at the three educational levels of baccalaureate, master's and doctorate. The next largest segments come through the humanities at the baccalaureate level and through library science at the master's level. Communications and business administration account for a certain percentage at all higher educational levels. Psychology is represented only slightly.

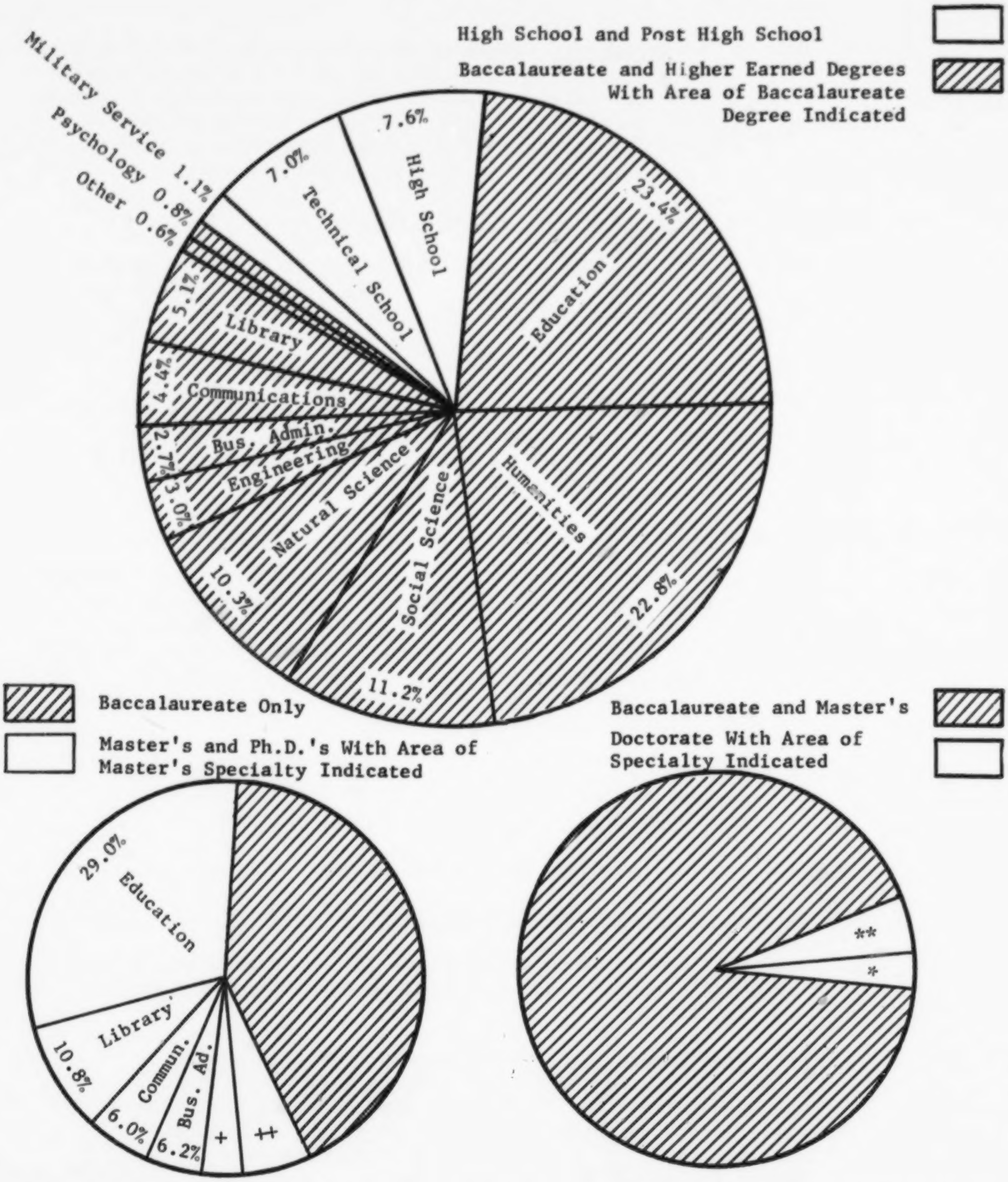
Approximately one-half of those with less than the baccalaureate degree have had technical school training while a smaller percentage have had similar training in the military services. This indicates that many technical specialties in the media field require post-high school training. Approximately 50% of those with earned degrees have earned at least a master's degree. This indicates that the more specialized areas in the media field are staffed to a considerable extent with people holding master's degrees. The Ph.D. requirements in the media specialties are at the present time relatively few as indicated by the fact that less than 7% of those with earned degrees hold this degree.

Although the proportions indicated by Figure 1 cannot be construed as representative of the population figures as a whole, some inferences may be drawn from the above data (and what we have learned of the skill and knowledge qualifications of present job incumbents). What is indicated is:

(1) The instructional media field is a technologically oriented field concerned with basic problems of communicating information formally (instructing); its organization being based on the merging of many diverse methodologies and techniques.

(2) Jobs in the media field at the technical level require individuals who have some skill and knowledge in methods and techniques of mechanics, electronics, graphic arts or optics.

(3) Jobs at the specialist level require individuals who have knowledge of classification method and logistics, communications method and technique, instructional technology theory and method, curriculum development or educational research.



+ 4.0%	Language		
++ 2.0%	English	.5%	Psychology
1.5%	Science	.2%	Social Work
.5%	Guidance	.5%	Other
.5%	History		

* 3.0% Education

** 1.5%	Business Admin.
1.5%	Communications
.2%	Language
.2%	Philosophy
.2%	Psychology

FIGURE 1. EDUCATIONAL BACKGROUND OF MEDIA PERSONNEL

(4) Jobs at the generalist (administration/supervision) level require individuals who have some knowledge of the principles of administration and supervision. (Questionnaire data available indicates that present administrative and supervisory personnel have at least three to seven years of practical experience in various phases of media organization operations and planning).

5. Occupational Group Assignment of Total Sample

Table 4 indicates the a priori assignment of the total respondent sample to occupational groups by sample category. The groups identified and the rules for assignment were discussed earlier. It may be noted that Group 13 (teachers and principals who are responsible for AV materials) is relatively small for the Prototypic sample. Media responsibilities at the professional, technical and clerical levels are generally organized into a range of instructional media jobs in the Prototypic Organizations surveyed; these same responsibilities are tacked onto existing teaching or supervision jobs in the western Pennsylvania region.

6. Non-Respondents

Figures are also given in Table 4 for numbers of non-respondents by group. The two largest percentages of non-respondents for the Representative category fall in Group 5 (TV production personnel) and Group 13 as identified above. In the Prototypic sample, the two largest percentages fall in Group 13 and Group 10 (TV and AV engineers). The non-respondents were surveyed to determine reasons for non-participation. In order they were:

(1) Time pressures
(2) Interference due to unexpected events
(3) Length of questionnaire
(4) Study did not appear to apply to them

A few indicated lack of interest in the objectives of the study.

7. Occupational Group Assignment According to Sub-Samples

The total sample of respondents (N=476) was subdivided into three relatively representative samples to be employed for the following purposes:

> Data from Sample 1, N=148, was used to develop scales to measure the FJA variables; data from Sample 2, N=206, was used to test the three basic hypotheses of the study with respect to patterns of job activities, vocational interests and job incentives; data from Sample 3, N=110, served for cross-validation purposes.

The group assignments of Samples 1, 2 and 3 are given in Table 5, Page 19.

Table 4

TOTAL SAMPLE (RESPONDENTS AND NON-RESPONDENTS)

By Sample Category and Occupational Group

		Representative Sample			Prototypic Sample		
Group	Occupational Group Identification	Respondents	Non-Resp.	Total	Respondents	Non-Resp.	Total
1	Administrator	13	2	15	14	4	18
2	Supervisor	46	8	54	34	5	39
3	College or University Teacher	1	0	1	1	0	1
4	Research Specialist	2	1	3	6	2	8
5	Media Production Specialist (TV)	6	3	9	20	0	20
6	Media Production Specialist (AV)	6	0	6	13	1	14
7	Instructional Media Specialist	13	0	13	20	0	20
8	Librarian	83	13	96	17	3	20
9	Computer Specialist	0	0	0	5	0	5
10	Engineer (AV, TV)	9	0	9	17	7	24
11	Television Teacher	4	1	5	1	1	2
12	Teacher	51	5	56	13	0	13
13	Teacher-AV Coord.	51	15	66	3	2	5
14	Clerical or Technical Assistant	17	0	17	9	0	9
		302	48	350	174	25	199

Percentage Return - 86%   Percentage Return - 89%

Total Percentage Return - 87%

Table 5

SAMPLES 1, 2 and 3 - OCCUPATIONAL GROUP IDENTIFICATIONS AND TOTAL NUMBER OF RESPONDENTS IN EACH GROUP

Combined Groups*	Original Groups	Occupational Group Identification	Number of Respondents Sample 1	Sample 2	Sample 3
1	1	Administrator	15	9	3
2	2	Supervisor	14	31	31
3	3	College or University Teacher	0	2	0
	4	Research Specialist	0	6	2
4	5	Media Production Specialist (TV)	11	11	4
5	6	Media Production Specialist (AV)	14	4	1
	7	Instructional Media Specialist	8	18	7
6	8	Librarian	20	41	36
7	9	Computer Specialist	0	4	1
	10	Engineer (AV and TV)	7	15	4
8	11	Television Teacher	4	1	0
	13	Teacher-AV Coordinator	17	25	9
9	12	Teacher	25	29	9
10	14	Clerical or Technical Assistant	13	10	3
		Total	148	206	110

*Note that some categories now contain two occupational groups from the original groups formed. Groups similar in job functions were combined where necessary to increase the size of the sample within a group for statistical analysis.

8. Men and Women in Media Occupations

Figure 2, Page 21, is based on an analysis of educational status of media personnel within each of the ten derived occupational groups. The focus is on a comparative analysis of occupational assignments of men and women. The occupational groups that have a considerable proportion of men and (to some extent) women with less than the baccalaureate degree include the technical specialities (e.g., engineers (AV and TV), computer specialists, media production specialists (AV), media production specialists (TV) and clerical or technical assistants). The occupational group that has the largest proportion of men and (to some extent) women with doctorates is that of research specialists, college and university teachers; administrators with doctorates are the next largest group with supervisors being third. The traditional occupations of librarianship and teaching claim approximately equal proportions of baccalaureate and master's degree women and (to a lesser extent) baccalaureate and master's degree men. The occupations having a larger proportion of women than men are those in the latter mentioned groups plus clerical and technical assistants. A certain proportion of females are found in all occupational groups with the exception of engineering. Of special note is the small proportion of females in the newer media occupations, i.e., the classes of jobs called Instructional Media Specialist and Teacher-AV Coordinator.

Figure 3, Page 22, is based on an analysis of salary ranges of media personnel within each of the derived occupational groups. The focus is on a comparative analysis of salary ranges of men and women. In brief, approximately one-half of the occupational groups have a large proportion of men and women in the salary range from $5,000 to $7,000; administrators are the single occupational group with a considerable proportion in the salary range of over $13,000; 95% of men and women in the clerical and technical assistant specialties are in the salary range of under $5,000. Proportionately, more men than women are at the higher levels of salary ranges although in most cases there is no sharp distinction between salary ranges for men and those for women.

D. Quantitative and Qualitative Analyses of the FJA Data

The three general measures obtained by the FJA scales developed for the study are as follows:

(1) Biographical information

(2) The functions the respondent performs in distinction to what gets done.

(3) The content of work to be performed by the respondent.

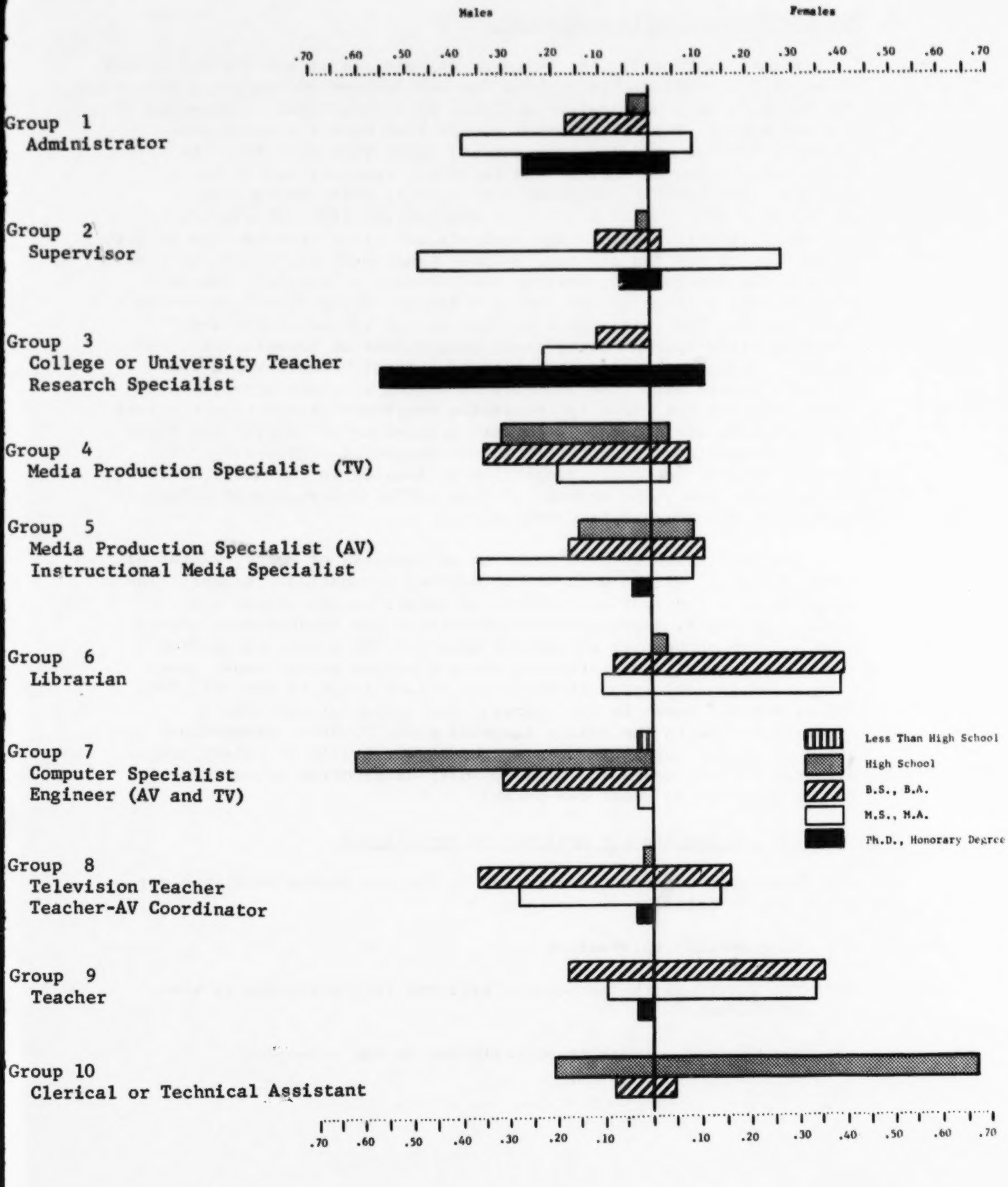


FIGURE 2. PROPORTIONATE DISTRIBUTION OF MALES AND FEMALES WITHIN DERIVED OCCUPATIONAL GROUPS, BY EDUCATIONAL STATUS - HIGH SCHOOL TO DOCTORATE

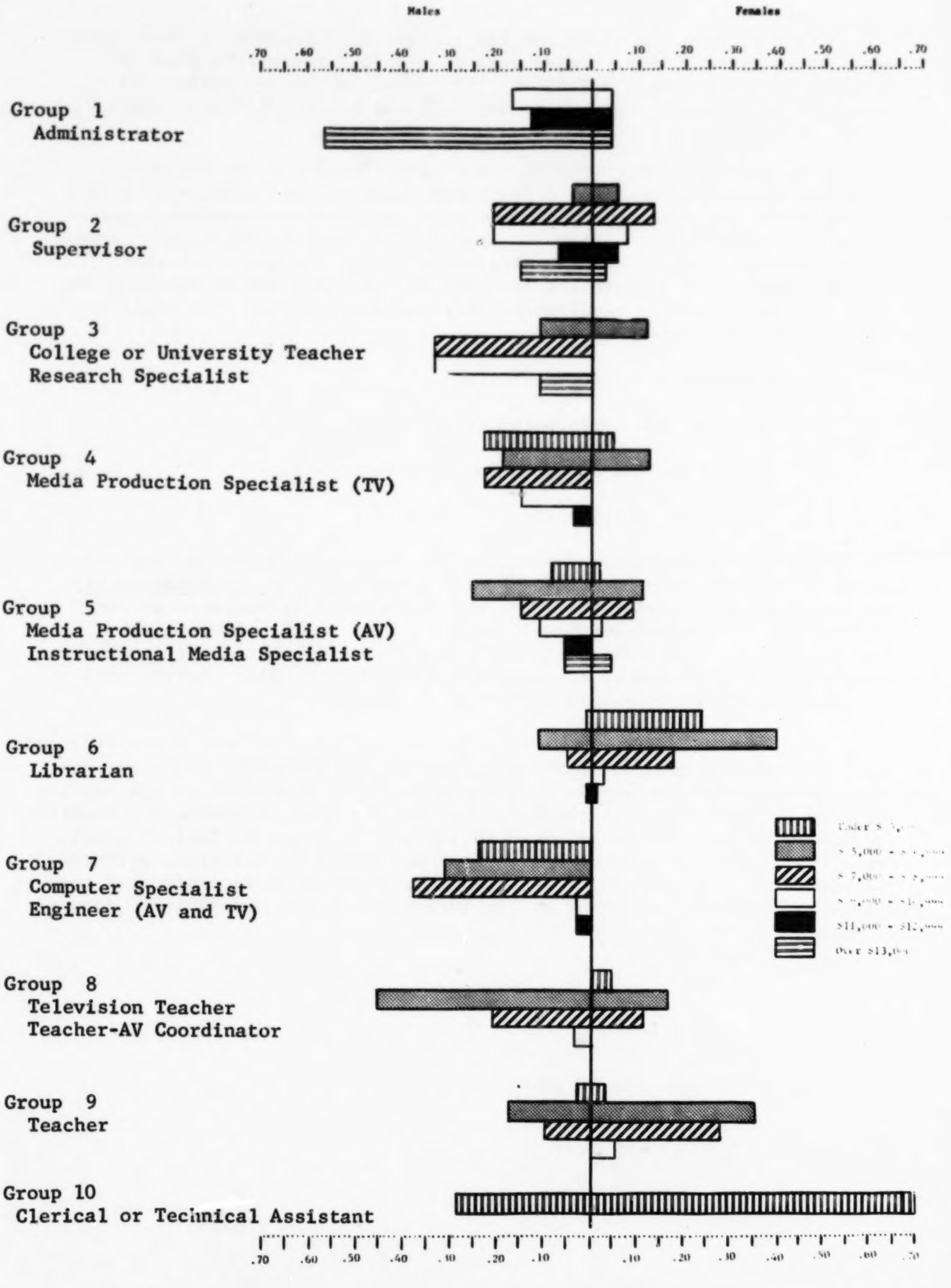


FIGURE 3. PROPORTIONATE DISTRIBUTION OF MALES AND FEMALES WITHIN DERIVED OCCUPATIONAL GROUPS, BY SALARY RANGES UNDER $5,000 TO OVER $13,000

Chart 2, Page 24, lists the FJA scales corresponding to these three general measures. These scales were developed through item analysis procedures using Sample 1 (N=148). The items on the Job Activities Schedule defining the FJA scales and definitions of FJA categories are given in Appendices G-1 and G-2.

A series of multivariate analyses of the quantitative FJA data resulted in a performance function index which grouped classes of jobs in the media field according to four major areas of performance requirements or capabilities. Figure 4, Page 25, represents graphically these four performance areas and the classification of the ten criterion groups (Sample 2). The four areas provide the basis for determining the education and training requirements for the media field. The areas indicated are as follows:

(1) Administration (Organization)

(2) Research and Development (Origination)

(3) Production and Distribution (Instrumentation)

(4) Operation (Utilization)

It can be seen from Figure 4 that the two important dimensions for functional classification identified by the study are: Level of Complexity and Content to be performed. Figure 4 attempts to approximate in two dimensions the multi-dimentional space for viewing the changing job requirements in the media field with reference to change in performance requirements developed by the separate analyses. Graphic representations of the separate analyses are presented in Appendix H.

The index which assigned criterion groups into the four areas outlined is, roughly, the mathematical average of the FJA variables providing the best partition of the sample of media personnel. A profile of the statistical midpoints of the criterion groups in each area according to functions performed by respondents is given in Table 6, Page 26. As Table 6 shows, there is a clear difference for each of the areas for different patterns of particular FJA variables. Table 6 also provides an indication of the range of functions performed by job incumbents in the occupational groups studied.

CHART 2 - (FJA) JOB ACTIVITIES VARIABLES

A. Biographical Variables

1 Age
2 Sex
3 Educational Status

B. FJA Data - What the Worker Does (Functions)

People Functions

Var.	Descriptive Term
1	Serving - Helping
2	Persuading
3	Instructing
4	Supervising
5	Negotiating

Data Functions

Var.	Descriptive Term
6	Coding - Compiling Computing
7	Classifying
8	Analyzing
9	Interpreting - Coordinating
10	Interpreting - Policy Making
11	Interpreting - Creating

Equipment, Material Functions

Var.	Descriptive Term
12	Precision Working - Setting Up
13	Operating - Controlling
14	Manipulating
15	Feeding - Tending
16	Handling

C. FJA - "Content" of Work to be Performed

17 Things
18 Data
19 People

Var.	Work Functions for Content Areas A,B (See key below)
20	Production
21	Distribution

Var.	Work Functions for Content Areas C, D, E
22	Production
23	Distribution

Var.	Work Functions for Content Areas F, G, H
24	Production
25	Distribution

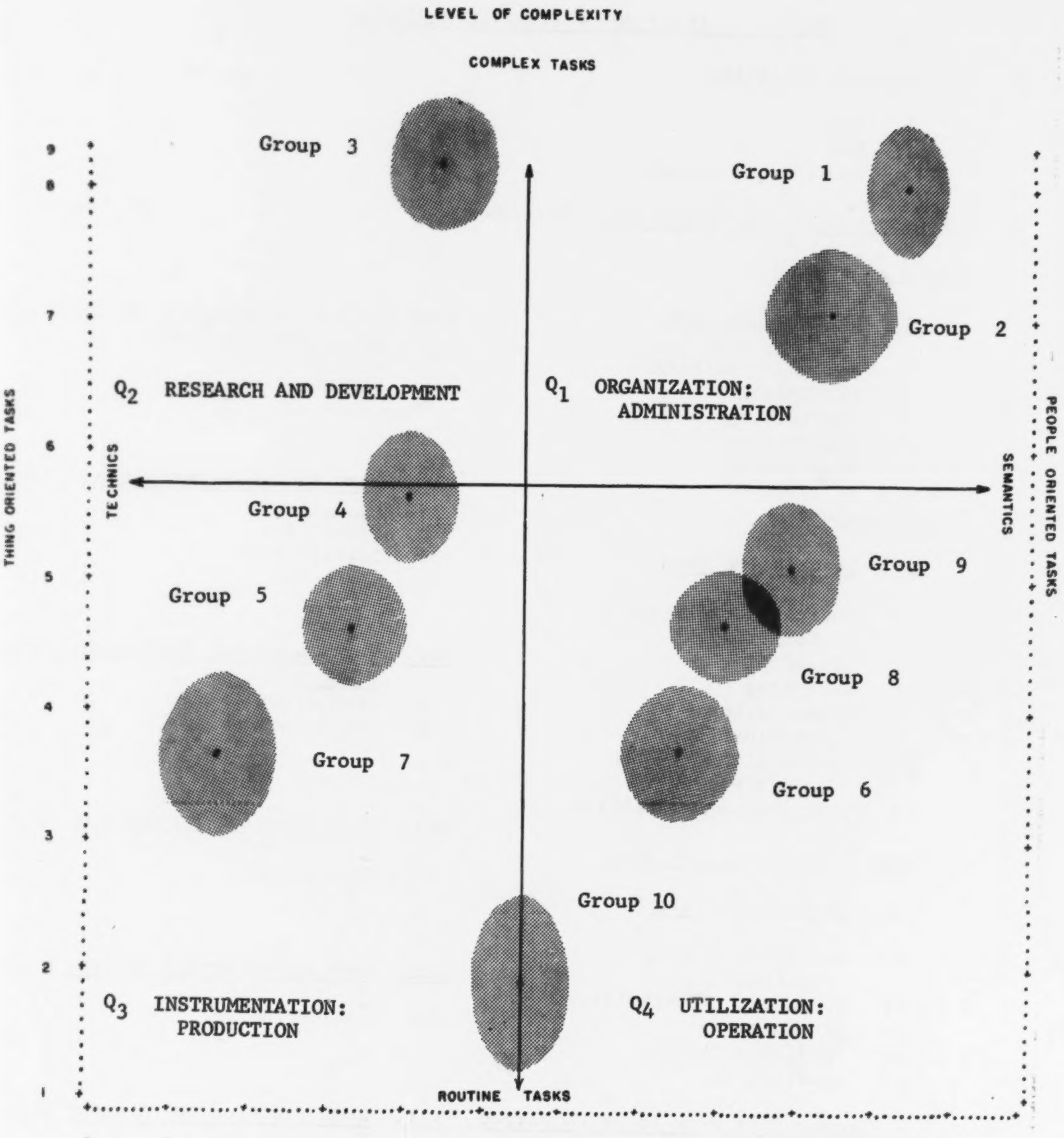
Var.	Work Function for Content Area I
26	Development

Var.	Work Function for Content Area J
27	Conduction

Var.	Work Function for Content Area K
28	Operation

Var.	Work Function for Content Area L
29	Utilization

Key for Content Areas:
(A) Printed Materials
(B) Non-projected Materials
(C) Still Projected Materials
(D) Motion Pictures
(E) Audio Recordings
(F) Live Audio Transmission
(G) Instructional Television
(H) Video Tape Recordings
(I) Programmed Instruction
(J) Research
(K) Data Processing
(L) Teaching Utilizing Media



Group 1	Administrator
Group 2	Supervisor
Group 3	College or University Teacher Research Specialist
Group 4	Media Production Specialist (TV)
Group 5	Media Production Specialist (AV) Instructional Media Specialist
Group 6	Librarian
Group 7	Computer Specialist Engineer (AV and TV)
Group 8	Television Teacher Teacher-AV Coordinator
Group 9	Teacher
Group 10	Clerical or Technical Assistant

FIGURE 4. OCCUPATIONAL GROUPS BY MAJOR PERFORMANCE AREAS

TAB

FUNCTIONAL JOB ANALYSIS DATA - GROUP MEANS

Occupational Groups by Area

FJA Variables	Organization/ Administration 1	Organization/ Administration 2	Research and Development 3	Instrumentation/ Production 4	Instrumentation/ Production 5	Instrumentation/ Production 7	Instrumentation/ Production 8	Utilization/ Operation 6	Utilization/ Operation 9	Support 10
People Functions										
1. Serving - Helping	1.0	1.7	1.6	2.2	2.3	3.7	2.7	3.7	1.6	4.1
2. Persuading	0.9	1.4	0.9	0.9	1.3	0.9	0.9	0.8	0.6	0.6
3. Instructing	1.7	1.4	1.9	0.4	1.7	0.5	2.5	1.7	4.1	0.5
4. Supervising	3.6	3.0	3.6	3.8	3.1	1.5	1.9	1.9	1.1	0.8
5. Negotiating	1.9	1.7	0.4	0.3	0.6	0.3	0.2	0.5	0.3	0.1
Data Functions										
6. Comparing - Coding Computing	0.3	0.7	1.1	0.8	1.1	2.3	1.7	3.2	0.8	4.1
7. Compiling - Classifying	1.1	1.3	1.3	1.4	2.3	1.1	1.1	2.0	1.2	0.5
8. Analyzing	1.1	1.0	1.9	1.9	1.2	0.4	1.2	0.7	2.0	0.0
9. Interpreting - Coordinating	1.3	1.7	2.0	2.6	1.6	1.8	1.5	1.6	1.4	0.8
10. Interpreting - Decision Making	3.3	2.3	0.6	0.5	1.4	0.5	0.9	0.5	0.3	0.1
11. Interpreting - Syntheses Designing, Creating	0.4	0.3	1.3	0.1	0.6	0.5	0.3	0.2	0.2	0.0
Equipment, Material, Thing Functions										
12. Precision Working - Setting Up	0.4	0.7	0.7	0.2	0.9	2.1	1.4	0.1	0.4	0.7
13. Operating - Controlling	0.0	0.3	1.1	1.1	0.3	2.3	0.7	0.1	0.4	0.6
14. Manipulating	0.4	0.6	0.6	1.2	1.1	0.4	1.1	0.5	1.0	0.1
15. Feeding - Tending	0.4	1.4	0.4	1.1	2.2	0.8	2.4	1.3	3.0	1.6
16. Handling	2.8	2.3	2.3	1.8	1.8	0.7	0.7	3.1	1.4	2.2
"Content" of Work to be Performed										
17. Things	0.4	0.7	1.2	1.7	2.6	5.2	3.7	1.9	1.4	3.7
18. Data	1.1	2.0	4.2	2.8	2.7	1.6	1.4	2.5	1.0	1.4
19. People	7.9	6.8	4.2	4.8	4.1	2.7	4.3	5.0	7.1	4.3

Key:

Group	
1	Administrator
2	Supervisor
3	College or University Teacher Research Specialist
4	Media Production Specialist (TV)
5	Media Production Specialist (AV) Instructional Media Specialist
6	Librarian
7	Computer Specialist Engineer (AV and TV)
8	Television Teacher Teacher-AV Coordinator
9	Teacher
10	Clerical or Technical Assistant

Charts 3 to 4 which follow provide a summary description of the major tasks performed by occupational groups in the Organization/ Administration area.

Charts 5 to 6 provide a summary description of the major tasks performed by occupational groups in the Research and Development area.

Charts 7 to 11 provide a summary description of the major tasks performed by occupational groups in the Instrumentation/Production area.

Charts 12 to 15 provide a summary description of the major tasks performed by occupational groups in the Utilization/Operation area.

CHART 3

THE NATURE OF JOBS IN THE ORGANIZATION/ADMINISTRATION AREA

GROUP 1 ADMINISTRATOR

PEOPLE	DATA	THINGS
Formulate policies and program for the total organization and/or relationship to other organizations; interpret plans, objectives and policies to individuals within my organization and other organizations; e.g., plan TV station schedule; work directly with Director of Professional Studies in designing a total college program in use of communications media; primary role is division head.	Formulate policies and objectives for overall organization in relation to its mission and fundamental needs on the basis of information received; e.g., formulate policies with vice-president's approval; help establish policies and objectives for the school or total program.	Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., use pencils; use telephone; etc.

CHART 4

THE NATURE OF JOBS IN THE ORGANIZATION/ADMINISTRATION AREA

GROUP 2 SUPERVISOR

PEOPLE	DATA	THINGS
Provide ideas and suggest solutions to instructional problems within my specialty on the basis of my experience in or knowledge of the field; e.g., plan and develop all ideas for the TV station; coordinate councils, steering committees, area council meetings; actively participate in the various professional organizations (board member, committee chairman, etc.); other activities related to that of elementary supervisor.	Evaluate materials or data to obtain information which can serve as a basis for recommendations concerning purchase, acceptance, or improvement; e.g., research availability of transparencies for purchase; review periodicals, professional literature, curriculum supplements, publishers' preview items, curriculum guides.	Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., prepare charts, stencils, dittos, mimeographed materials; use pencils and pens for writing reports and articles.
Formulate policies and program for the total organization and/or relationship to other organizations; interpret plans, objectives and policies within my organization and other organizations; e.g., Director of Division of Research; formulate plans for information retrieval; discuss, evaluate and review programs and proposals; formulate administrative procedures to be followed with respect to instructional materials and equipment.	Interpret organizational data to plan work programs within set policy limitations; e.g., direct supervision of all instructional television personnel, assign classes to teachers, schedule classes.	
	Formulate policies and objectives for overall organization in relation to its mission and fundamental needs on the basis of information received; e.g., suggest new materials and change purchases and delivery to meet new curriculum changes and school organization; meet with teachers and other groups to discuss problems and try to come up with solutions.	

CHART 5

THE NATURE OF JOBS IN THE RESEARCH AND DEVELOPMENT AREA

GROUP 3 COLLEGE OR UNIVERSITY TEACHER

PEOPLE	DATA	THINGS
Familiarize students with instructional media available; teach both undergraduates and graduates using such resources as rear screen projectors and telemation.	Evaluate audiovisual equipment particularly relative to television; plan schedule and activities for a course.	Make or assemble transparencies and overlays for TV shows and teleprompter lectures.
	GROUP 4 RESEARCH SPECIALIST	
Provide ideas and suggest solutions to instructional problems within my specialty on the basis of my experience in or knowledge of the field; e.g., provide ideas to teachers and writers of materials and to educational personnel in charge of use of materials; act as a member of a team on most research projects - the coordination between the faculty and the data processing center.	Evaluate materials or data to obtain information which can serve as a basis for recommendations concerning purchase, acceptance or improvement; e.g., materials from commercial suppliers; evaluation of new techniques and ideas; evaluation of elementary education program test data.	Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., occasionally use a dictaphone; use the telephone to arrange for interviews; use a pencil to write reports.
Interpret plans and objectives to members of my organization; determine procedures and assign duties to carry out plans; evaluate personnel performance; e.g., process and analyze data for a number of Latin American collaborators - establish priorities, handle some funding aspects, etc.; interview instructors who had a role in the development of a particular instructional system being studied by our projects.	Analyze and examine instructional situations for media applications; e.g., determine procedures for making media application and rationale for the procedures; examine copies of programs from textbook publishing companies.	

CHART 6

THE NATURE OF JOBS IN THE RESEARCH AND DEVELOPMENT AREA

GROUP 5 MEDIA PRODUCTION SPECIALIST (TV)

PEOPLE	DATA	THINGS
Provide ideas and suggest solutions to instructional problems within my specialty on the basis of my experience in or knowledge of the field; e.g., meet with instructor and discuss most advantageous use of TV techniques in presenting material in a lesson; take or create program ideas and carry them out to completion through script and total production phases.	Analyze and examine instructional situations for media applications; e.g., select the best visuals for a particular program; examine situations for producing and writing general interest programs - on adult level and children's instructional level.	Make or assemble materials according to specifications; e.g., construct scenery, props, etc. according to need; develop transparencies; process still photos, edit 16 mm. film.
Interpret plans and objectives to members of my organization; determine procedures and assign duties to carry out the plans; evaluate personnel performance; e.g., assign producers and directors; assign duties to staff directors and cameramen; responsible for all programming.	Utilize experience and knowledge to solve problems within my area; e.g., draw on experience of 13 years in TV and related communication media; overcome scheduling conflicts; plan new administration process, recommend materials and books to people who are setting up centers.	Operate equipment which requires occasional or minor adjustment; e.g., operate film projector, slide projector, audiotape machines, overhead projector.
	Interpret organizational data to plan work programs within set policy limitations; e.g., assign work schedule on basis of class schedule from scheduling office; work out production problems which necessitates setting policy within my authority.	Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., use telephone, use pencils and pens.

CHART 7

THE NATURE OF JOBS IN THE INSTRUMENTATION/PRODUCTION AREA

GROUP 6 MEDIA PRODUCTION SPECIALIST (AV)

PEOPLE	DATA	THINGS
Receive and take action on instruction or assignment where procedures are all or mostly specified; e.g., printing of supers and polaroid; requisitioning supplies and equipment; working on visuals as specified by supervisor.	Analyze and examine instructional situations for media applications; e.g., deciding how best to visualize lessons and panel shows; designing scenery; devising graphic and photographic visuals.	Make or assemble materials according to specifications; e.g., preparing art for transparencies; taking and mounting polaroids; developing film; using printing press for supers; drawing and painting.
Obtain information from or give information to others to clarify objectives and procedures; e.g., talk to producer and/or director about a set design, work with teachers and administration.		
Provide ideas and suggest solutions to instructional problems within my specialty on the basis of my experience in or knowledge of the field; e.g., preparing instructional TV programs with TV instructors; prepare instructional TV program.		

CHART 8

THE NATURE OF JOBS IN THE INSTRUMENTATION/PRODUCTION AREA

GROUP 7 INSTRUCTIONAL MEDIA SPECIALIST

PEOPLE	DATA	THINGS
Provide ideas and suggest solutions to instructional problems within my specialty on the basis of my experience in or knowledge of the field; e.g., serve on planning board of two in-service meetings; advise science, English and modern language panelists in best methods of presentation; integrate and implement AV material with the courses of study at the elementary and secondary levels.	Evaluate materials or data to obtain information which can serve as a basis for recommendations concerning purchase, acceptance or improvement; e.g., set up a provisional committee to help evaluate films for purchase; preview films.	Operate equipment which requires occasional or minor adjustment; e.g., operate projector for preview of film; handle AV equipment; use all kinds of projectors.
Interpret plans and objectives to members of my organization; determine procedures and assign duties to carry out plans; evaluate personnel performance; e.g., serve as "gate-keeper" between director of center and film production personnel; describe and assign duties for preparing and presenting programs to technicians, artists and student aids.	Interpret organizational data to plan work programs within set policy limitations; e.g., plan daily operation schedules which contain all information needed for broadcast day; plan all adult educational programs from suggestions from publishers and ideas obtained from talking to other people or reading about programs - then assign staff to help carry out plans.	Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., use telephone; write releases, articles, copy scripts with pencil.
Direct course of action for major portion of organization, group, or division on the basis of known information, opinion or needs; e.g., direct course of action for AV aids in the district; see that policy is carried out by members of my staff and evaluate their performance in doing so.		

CHART 9

THE NATURE OF JOBS IN THE INSTRUMENTATION/PRODUCTION AREA

GROUP 9 COMPUTER SPECIALIST

PEOPLE	DATA	THINGS
Receive and take action on instruction or assignment where procedures are all or mostly specified; e.g., follow job procedures when operating computer as specified by programmers and systems analysts.	Code, enter, or post data or information by hand or machine; e.g., code computer program.	Start, stop and control equipment which requires some adjustments in order that it perform properly; e.g., operate 1401, 1402, 729II computers; conduct computer tests of programs on IBM 1401 and IBM 7074.
Attend to needs or requests; e.g., obtain information (reports) via mechanical methods; write programs where needed at the request of the chief systems programmer.	Check against manuals, models, textbook references or established instruction to secure, sort or arrange equipment, information or individuals; e.g., various research and production sources; IBM manuals.	
	Utilize experience and knowledge to solve problems within my area; e.g., write computer programs for the processing of arithmetic, equations, sorting data, etc.	

CHART 10

THE NATURE OF JOBS IN THE INSTRUMENTATION/PRODUCTION AREA

GROUP 10 ENGINEER (AV, TV)

PEOPLE	DATA	THINGS
Receive and take action on instruction or assignment where procedures are all or mostly specified; e.g., check equipment before TV presentation; adjust audio and video control during presentation; clean and maintain equipment; set up TV studio for class.	Check against manuals, models, textbook references, or established instruction to secure, sort or arrange equipment, information or individuals; e.g., check quality of equipment against a "standard" sound tape and graphs in operating manual; check technical manuals for proper part order numbers; consult technical data in maintenance of electronic equipment.	Repair and adjust equipment to operate properly, altering its function, or restoring malfunctioning equipment for myself or others; e.g., repair, adjust and operate all TV studio equipment, maintain all AV equipment on campus. Start, stop and control complex scanning equipment whose operation depends upon response to give signals; e.g., operate TV camera, operate monitor equipment, have responsibility for audio control and maintenance of video shading.

CHART 11

THE NATURE OF JOBS IN THE INSTRUMENTATION/PRODUCTION AREA

GROUP 14 CLERICAL OR TECHNICAL ASSISTANT

PEOPLE	DATA	THINGS
Receive and take action on instruction or assignment where procedures are all or mostly specified; e.g., answer letters, set up form letters and other blanks; perform routine secretarial duties; collect books for review; send notices to students who are delinguent in returning books.	Code, enter, or post data or information by hand or machine; e.g., help in cataloging all tapes, records and scripts and then keep up to date; keep accurate time log of on-the-air programming on daily operation schedule.	Operate equipment which requires occasional or minor adjustment; e.g., rewind films; play prescribed audiotapes and monitor student effort; set and light TV shows; operate filmstrip projector, perceptiscope.
Attend to needs or requests; e.g., take requests from teachers, etc. for AV materials, charge books for schools.	Check against manuals, models, textbook references, or established instruction to secure, sort or arrange equipment, information, or individuals; e.g., pull cards on overdue books; type book orders from catalogs.	Insert or remove materials from equipment or machines which are automatic or previously adjusted; e.g., ditto machine, typewriter, dictaphone, film inspecting machine, adding machine.
Obtain information from or give information to others to clarify objectives and procedures; e.g., receive information from office of daily shipments; coordinate efforts of other clerks in regard to unexpected work; inform and instruct students in use of language laboratory equipment and explain how to use program they will receive.		Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., staple papers, answer and dial phones, load book cart, fill in requisitions

THE NATURE OF JOBS IN THE UTILIZATION/OPERATION AREA

GROUP 8 LIBRARIAN

PEOPLE	DATA	THINGS
Attend to needs or requests; e.g., charge out books; order books and films for instructors; schedule projection service when requested; attempt to answer reference questions; aid students and teachers; select books for units for kindergarten and special education.	Check against manuals, models, textbook references or established instruction to secure, sort or arrange equipment, information or individuals; e.g., read book selection aids and select books from them; update catalog cards and information cards and revise system as needed in order to best serve students and faculty; review and requisition from Wilson Standard Catalogs, ALA Bulletin, School Library Journal, and book companies; keep a daily list of students' names with the author and title of books they have overdue.	Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., load book carts; use binding materials (paste, etc.) for repairing books and periodicals; use electric stylus; stamp date in circulation books; draw lines with red pencil on coding sheet.
Communicate knowledge in classroom, laboratory or meeting to individuals or groups for the purpose of informing them about some subject matter; e.g., teach library science; give book talks to groups upon request; go to classrooms to give orientation lectures; recommend books to students.	Catalog or classify materials according to established methods; e.g., catalog books by Dewey Decimal System; catalog books for which no L.C. copy exists by L.C. and ALA rules.	
	Evaluate materials or data to obtain information which can serve as a basis for recommendations concerning purchase, acceptance or improvement; e.g., carefully check book selection tools (ALA, Library Journal, Wilson High School Catalog, etc.); evaluate materials in relation to curriculum needs and suggest uses with various teaching areas; create or procure materials and check on its proper utilization within the classroom.	

CHART 13

THE NATURE OF JOBS IN THE UTILIZATION/OPERATION AREA

GROUP 11 TELEVISION TEACHER

PEOPLE	DATA	THINGS
Communicate knowledge in classroom, laboratory or meeting to individuals or groups for the purpose of informing them about some subject matter; e.g., teach general science in such areas as earth sciences, space sciences, life sciences; execute ideas for over 70 lessons per year for instructional television; instruct via TV for in-school viewing by school children.	Evaluate materials or data to obtain information which can serve as a basis for recommendations concerning purchase, acceptance or improvement; e.g., suggest purchase of equipment or materials that could be useful in program; report on the recommendations made by classroom teachers who serve on an evaluation committee and who use course; use many texts, magazines, courses of study, etc. in devising what is to be taught in a specific lesson.	Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., make phone calls to resource people for help with TV lesson; use a pointer; manipulate set pieces in studio; use papercutter.

CHART 14

THE NATURE OF JOBS IN THE UTILIZATION/OPERATION AREA

GROUP 12 TEACHER

PEOPLE	DATA	THINGS
Communicate knowledge in classroom, laboratory or meeting to individuals or groups for the purpose of informing them about some subject matter; e.g., instruct students in use of tapes for listening, practicing and recording; instruction in shorthand through tape; classroom teaching; provide in-service training in use of AV equipment.	Analyze and examine instructional situations for media applications; e.g., obtain pictures to complement and clarify lessons; compile visual materials for lesson presentation; secure additional materials from schools department to supplement classroom library needs; analyze and devise integrated language lab-classroom program.	Operate equipment which requires occasional or minor adjustment; e.g., tachistoscope, movie projector, tape recorder, film strip projector, language listening post, reading machine. Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes; e.g., write with pencil or pen; use chalk at board; staple papers; package books; paste book pockets; mount pictures; use punch to make holes for scrapbooks; use compass, straight edge, triangle.

CHART 15

THE NATURE OF JOBS IN THE UTILIZATION/OPERATION AREA

GROUP 13 TEACHER-AV COORDINATOR*

PEOPLE	DATA	THINGS
Attend to needs or requests; e.g., fill all requests for equipment and operators; order films for teachers; schedule showings.	Check against manuals, models, textbook references or established instruction to secure, sort or arrange equipment, information or individuals; e.g., order equipment and materials from catalogs; check all film requisition cards received from teachers.	Repair and adjust equipment to operate properly, altering its function, or restoring malfunctioning equipment for myself or others; e.g., repair projection equipment; service all school electronic and audiovisual equipment.
Communicate knowledge in classroom, laboratory or meeting to individuals or groups for the purpose of informing them about some subject matter; e.g., instruct teachers in use of AV equipment; meet with faculty committees and groups; give talks to parent groups; sponsor projector club; use language tapes in lab and classroom for instruction.	Analyze and examine instructional situations for media applications; e.g., library research for production materials; provide aids which do not exist to make a lesson more comprehensive; select subject matter from publications, book companies and film libraries	Operate equipment which requires occasional or minor adjustment; e.g., operate language laboratory console, overhead projector, tape recorder, stage lighting, etc.
	Interpret organizational data to plan work programs within set policy limitations; e.g., set up overall schedule of student lab classes; cooperate with other schools in use of equipment and materials; assign student help to specific jobs such as set-up and operation of equipment.	

*These activities reflect media service activities only.

Summary

From examination of these charts we can see that different media groups are distinguished both quantitatively and qualitatively by different performance functions. Therefore, FJA analysis is useful in determining what kinds of tasks different groups perform. With this information we can begin to evaluate present practices and future needs. These implications will be discussed in a later section of the report.

Nature of the Occupational Group Differences

Table 7, Page 42 provides the F ratios for the different variables indicating which variables are the most important in discriminating the groups. The values given are the values for a one way analysis of variance. Those variables which have high F's are discriminating the groups and those which have low F's are not discriminating the groups.

The Scaled Vectors, Table 7, gives the FJA variables and their respective weights for important dimensions which distinguish among jobs. When we compare how groups are discriminated we find in brief, the following: (Plots of these discriminant functions are presented in Appendix H.)

(1) Administrators (Group 1) and Supervisors (Group 2) are primarily people-oriented. Group 1 and (to a lesser extent) Group 2 are differentiated from the other groups on the basis of negotiating (i.e., exchanging ideas, information and opinions with others in order to formulate policy and programs and arrive at decisions, conclusions or solutions to problems in the development, production, distribution or use of instructional materials). These groups are not likely to engage in activities of coding, computing or compiling.

(2) Research and Development (Group 3) is somewhat differentiated on the basis of data functions. This group is not clearly differentiated in the present study due to the small numbers of individuals in the sample which tends to mitigate against obtaining any significant differences.

(3) We find that Television Production Personnel (Group 5) and Instructional Media Specialists (Group 4) are differentiated from the other groups primarily on the basis of being more concerned with the data function of analysis (i.e., examining and evaluating data). These data functions are performed mainly in connection with the need for appropriate application of audiovisual techniques to given instructional situations.

(4) Librarians (Group 6) are primarily people-oriented. They are distinguished from the other groups by performing the sharply contrasting functions of formulating policies and programs for distribution of printed and projected material while at the same time performing the lower level data functions of coding (i.e., transcribing or posting data), computing (i.e., performing arithmetic operations and reporting on them) or compiling (i.e., gathering, collating or classifying information).

(5) Engineers (AV and TV) (Group 7) are differentiated on the extent to which individuals in this group are engaged in the setting up or adjusting of machines or equipment to prepare them to perform their functions and have responsibility for the selection of the appropriate tools, objects or materials to be used; this selection requires the exercise of considerable judgment.

TABLE 7

FUNCTIONAL JOB ANALYSIS DATA

No.	Variable	F Ratios$^{9}_{210}$		Scaled Vectors			
		F	P	1	2	3	4
1	Age	4.93	$2x10^{-4}$	0.06	0.01	0.23	-0.03
2	Sex	8.34	$1x10^{-8}$	-0.13	-0.03	0.10	
3	Ed. Status	2.40	0.01	0.09	0.07	-0.00	-0.06
4	Serving	9.13	$1x10^{-9}$	0.19	-0.19	0.03	0.10
5	Persuading	2.10	0.03	0.20	0.23	-0.15	0.05
6	Instructing	13.80	$1x10^{-14}$	0.12	-0.13		0.15
7	Supervising	7.58	$1x10^{-7}$		0.09	-0.01	0.17
8	Negotiating	7.37	$1x10^{-7}$	0.28	0.05	0.02	-0.15
9	Coding, Compiling Computing	13.75	$1x10^{-14}$		0.25	-0.26	0.02
10	Classifying	2.79	0.004	-0.19	0.21	-0.18	
11	Analyzing	4.48	$1x10^{-4}$	-0.04	0.14	-0.13	
12	Interpret.-Coord.	1.20	0.2	-0.07	0.11	-0.17	0.19
13	Interpret.-Policy Making	12.80	$1x10^{-13}$	-0.01		-0.11	-0.05
14	Interpret.-Synthesizing	3.16	0.001	-0.04	0.05	-0.09	0.07
15	Precision Working	5.33	$6x10^{-5}$	0.06		-0.08	-0.16
16	Operate.-Control.	7.05	$4x10^{-7}$	-0.16	-0.22	-0.14	-0.14
17	Manipulating	1.49	0.1	0.02	-0.15		0.05
18	Feeding-Tending	5.08	$1x10^{-4}$	-0.05	-0.17		0.24
19	Handling	6.80	$9x10^{-7}$	-0.10	0.09	0.21	0.05
20	Things	9.37	$7x10^{-10}$	-0.06		0.02	
21	Data	4.42	$3x10^{-4}$	-0.09	-0.09	0.11	-0.18
22	People	9.78	$2x10^{-10}$	-0.03	-0.08	0.18	
	Work Area:						
23	Production (a,b)	5.00	$1x10^{-4}$	0.29	0.06	0.00	-0.03
24	Distribution (a,b)	10.04	$1x10^{-10}$			0.19	0.02
25	Production (c,d,e)	3.70	$2x10^{-3}$	-0.09	0.04	-0.16	0.12
26	Distrib. (c,d,e)	5.25	$8x10^{-5}$	0.18	0.14	0.12	0.16
27	Prod. (f,g,h)	9.23	$1x10^{-9}$	0.04	0.10	-0.07	-0.12
28	Dist. (f,g,h)	2.72	0.005	0.03	-0.17	-0.07	0.23
29	Develop (i)	2.64	0.006	0.15	-0.07	0.14	-0.15
30	Conducting (k)	3.79	$2x10^{-3}$	0.04	0.06	0.14	0.03
31	Operation (m)	1.71	0.08	0.02	-0.11	-0.09	0.03
32	Utilization (n)	2.80	0.004	-0.10	0.30	0.07	-0.14

Work Area:
(a) Printed Materials
(b) Non-projected Materials
(c) Still Projected Materials
(d) Motion Pictures
(e) Audio Recordings
(f) Live Audio Transmission
(g) Instructional Television
(h) Video Tape Recordings
(i) Programmed Instruction
(k) Research
(m) Data Processing Equipment
(n) Teaching Utilizing Media

(6) Teacher-AV Coordinators (Group 8) are differentiated on the basis of the instructing function and the extent to which they are involved with the operation, maintenance and repair of audiovisual materials and equipment.

(7) We find that Teachers Utilizing Media (Group 9) differ from the other groups by being more engaged in communicating knowledge in a formal matter (i.e., instructing) as is to be expected. It is interesting to note that this group is more inclined to engage in activities of feeding and tending of equipment and machines than the other groups. Such activities involve starting, stopping and observing the functioning of machines and equipment (e.g., 16 mm. film projectors, slide projectors, tape recorders, etc.), adjusting materials or controls of equipment (e.g., consoles of language laboratories), inserting or placing materials in or removing them from the machines or equipment which are automatic (e.g., thermofax and duplicating equipment). Little judgment is involved in making these adjustments. There is also some tendency for this group to be involved in activities requiring tools or special devices and involving some latitude for judgment with regard to precision attained (e.g., science demonstrations).

On the basis of these analyses, we can conclude that Function 1 (see Figure 4, Page 25), horizontal axis, orders the criterion groups along a "content to be performed" dimension with people-oriented tasks (e.g., negotiating, supervising, instructing) at the one end and thing-oriented tasks (e.g., techniques, producing media, executing a procedure-dealing with the practical) at the other end. The functional thread of the scale is seen as the orientation toward or away from people. Function 2, of Figure 4, vertical axis, orders the functional groups along a "level of complexity" dimension with taking instruction, coding, compiling (attention to clerical detail and adherence to classification criteria) at the lower end of the scale and synthesizing, coordinating (determining time, place and sequence of operations for action to be taken and interpreting analyses of data or developing knowledge concepts) at the higher end. The functional thread of this scale can be seen as orientation toward or away from higher level conceptualizing processes.

An additional test as to whether or not the quantitative FJA variables predict membership in the ten functional groups was performed. Classification chi squares were computed for Sample 2 and for Sample 3. Table 8, Page 44, shows that 74.7% hits were made for Sample 2 and 48.2% hits for Sample 3, the cross-validation sample. (The diagonal cell entries in Table 8, i.e., from upper left to lower right, are the correct classifications.) Most misclassifications result from a confusion of Supervisors with Administrators; Librarians with Teacher-AV Coordinators; Teacher-AV Coordinators with Teachers; and Clerical and Technical Assistants with Librarians. Poorest predictions for the cross-validation sample are for Supervisors, Television Production Personnel and Clerical and Technical Assistants. Many misclassifications are probably due to the small numbers in particular cross-validation groups.

It is evident that the best predictions or functional distinctions according to FJA data can be made with jobs that have performance functions that are readily identifiable and well defined (e.g., for Librarians, Engineers, Research Scientists and Teachers). It may be noted that many media personnel perform supervisory functions as well as some instructing functions; many misclassifications result from this type of overlap.

TABLE 8

OCCUPATIONAL GROUP CLASSIFICATIONS BASED ON FJA DATA

Hits and Misses for Sample 2

N=206

ACTUAL

PREDICTED	1	2	3	4	5	6	7	8	9	10	Number in Occup. Group
1	7	2									9
2	4	17	2		1	4		3			31
3		1	4		2			1			8
4		1		10							11
5		1	1	1	14	1		4			22
6		1				38	1			1	41
7			1				18				19
8		2		1	1		1	16	5		26
9						1		1	25	2	29
10						4			1	5	10
	11	25	8	12	18	48	20	25	31	8	206

74.7% hits

CROSS-VALIDATION OF OCCUPATIONAL GROUP CLASSIFICATIONS BASED ON FJA DATA

Hits and Misses for Sample 3 (Cross-Validation Sample)

N=110

ACTUAL

PREDICTED	1	2	3	4	5	6	7	8	9	10	Number in Occup. Group
1		3									3
2	4	16		1	2	1	4	3			31
3		1			1						2
4	1				2		1				4
5		4		1			1	2			8
6		5				28		2	1		36
7				1			2	2			5
8					2		1	3	3		9
9						1	1	3	4		9
10					1	1		1			3
	5	29	0	3	8	31	10	16	8	0	110

48.2% hits

E. Quantitative and Qualitative Analyses for Strong Vocational Interest Data

The purpose of this analysis was to test the following hypothesis:

> Measures of interest contain information distinguishing the performance functions of different jobs in the media field.

The SVIB scores for Sample 2 for the ten derived occupational groups were used for this analysis. The ten groups are the same groups as used in the FJA analysis. The N for this sample was 203 since several cases were not included due to missing data. Table 9, Page 46, lists the F ratios for the thirteen interest variables used and indicates which variables discriminate the different occupational groups. Values given are for a one way analysis of variance within the ten groups. Note that Variables 4, 5, 7, 8, 10, 11, 12 and 13 are primary discriminators of the group. These are Physical Science Interests, Social Service and Welfare Interests, Sales or Business Contact Interests, Specialization Level, Occupational Level, Masculinity or Femininity of Interests, Technical and/or Skilled Trades Interests and Musical Interests.

The roster of group means, Table 9, shows which groups are high and which groups are low on these various variables.

Taking Variable 12, Technical and/or Skilled Trade Interests, we can see that Teachers and Librarians characteristically have a low interest in this variable. This correlates with what we have previously learned about Teachers and Librarians, i.e., they perform relatively few tasks concerned with the technical problems of producing media. Variable 11, Masculinity-Femininity of Interests, provides additional confirmation of Teachers and Librarians lack of interest in technical problems. Masculinity-Femininity of Interests simply means that a person's interests are more like those of men (high scores) or more like those of women (low scores). It has been found that men's interests tend toward the scientific and technical while women's interests tend toward the linguistic, social and artistic. Teachers and Librarians are the two groups having low scores on Variable 11, indicating a femininity of interest. The large preponderance of females in both these groups may explain the findings: however, other reports show that both men and women definitely tend to lie further toward the feminine end of this scale. These results confirm the results of a prior analysis of SVIB data (Sample 1), see Appendix I.

Taking Variable 5, Social Service Interests, we see that Engineers, Clerical and Technical Assistants, and Teacher-AV Coordinators characteristically are low in this interest. The pattern of scores for this variable, as one might expect, shows considerably higher scores for those who deal primarily with people and lower scores for those who deal with technical or routine tasks. Taking Variable 7, Sales or Business Contact, we see that Engineers and Teacher-AV Coordinators are low in this interest, while scores are characteristically higher for the other groups, especially Librarians and Instructional Media Specialists. Looking at Variable 10, Occupational Level Interest, we can see that Engineers, Teachers, Teacher-AV Coordinators, Librarians, and Clerical

STRONG VOCATIONAL INTEREST DATA

Table 9

~ Variables	Roster of Group Means										F Ratio		Scaled Vectors			
	Organization/ Administration		Research & Development	Instrumentation/ Production				Utilization/ Operation		Support	F^{9}_{210}	P.	1	2	3	4
	1	2	3	4	5	7	8	6	9	10						
1 Group III Production Manager	14.89	18.61	10.63	13.91	15.95	21.17	22.11	16.47	14.97	17.67	1.54	0.1	0.21	0.14	0.12	0.47
2 Group X Verbal or Linguistic	39.11	41.13	39.13	37.18	39.38	32.17	38.21	37.92	39.00	36.58	1.07	0.3	-0.09	-0.34	-0.54	-0.30
3 Group I Biological Sciences	32.00	35.03	31.50	32.36	34.76	30.50	34.07	34.25	33.86	36.67	0.41	0.9	0.01	0.36	0.34	0.43
4 Group II Physical Sciences	39.00	37.55	35.00	30.64	37.00	21.11	30.86	34.50	35.14	26.17	4.78	3x10-4	0.11	0.48	-0.14	-0.04
5 Group V Social Service	29.33	32.23	29.38	29.27	35.48	19.83	26.46	35.67	31.83	27.25	3.79	2x10-3	-0.26	0.14	0.21	0.48
6 Group VIII Business Detail	35.67	39.16	43.50	43.00	42.29	36.89	34.14	42.17	39.72	43.17	1.80	0.06	0.06	-0.10	0.26	-0.18
7 Group IX Sales or Business Contact	37.00	39.68	39.88	39.09	41.57	28.06	32.68	40.67	39.83	39.00	2.86	0.003	0.29	0.25	-0.13	-0.31
8 Specialization Level	51.89	47.74	54.13	49.00	48.86	44.67	43.71	44.14	42.97	39.25	3.00	0.002	0.15	0.30	-0.16	0.16
9 Interest Maturity	55.22	55.65	55.38	54.73	56.57	52.44	54.96	55.28	54.31	53.50	0.74	0.6	0.14	-0.14	-0.02	-0.28
10 Occupational Level	62.22	59.90	60.50	60.73	60.24	54.44	57.71	58.22	58.52	52.92	2.62	0.007	0.13	0.49	0.29	0.11
11 Masculinity - Feminin.	40.11	36.42	41.50	37.82	34.38	50.06	43.11	26.61	30.72	28.75	6.61	1x10-6	0.63	-0.15	0.14	0.06
12 Group IV Technical and/or skilled	239.44	245.42	256.38	239.45	243.19	325.44	286.54	219.83	224.21	252.25	2.15	0.02	-0.52	0.20	0.25	-0.10
13 Group VI Musician	65.89	50.74	73.00	58.00	48.76	75.33	59.00	46.00	45.52	36.17	4.14	7x10-4	0.22	0.25	-0.42	-0.08

and Technical Assistants are discriminated by lower scores on this variable. Here low scores indicate interests similar to those of lower level occupational groups while high scores indicate interests similar to those of businessmen and professionals. Looking at Variable 8, Specialization Level, we see that Administrators, Research and Development Scientists, Instructional Media Specialists and Television Production Personnel are high in this interest. High scores indicate interests similar to those of specialized personnel while low scores indicate interests similar to non-specialists.

It must be emphasized that it is the whole pattern of vocational interest likes and dislikes which determine group membership. For this reason, the SVIB variables were collapsed by selected statistical procedures (as in the previous analysis). What resulted was Function 1, the Organization-Business Interest versus Social Service Interest function, and Function 2, the Specialization Level Interest function. Table 9, Page 46, Scaled Vectors, gives the list of SVIB variables used to define interests of media personnel and their respective "weights" for Function 1 and Function 2. For Function 1, the variables doing most of the discriminating are: Variable 11, Masculinity-Femininity and Variable 7, Sales or Business Contact, weighted positively and Variable 5, Social Service Interest, and Variable 12, Technical and/or Skilled Trade, weighted negatively. Therefore, this statistical function appears to separate the functional groups according to technological orientation. Function 2 is heavily weighted with Variable 10, Occupational Level, and Variable 8, Specialization Level, weighted positively, and Variable 2, Verbal or Linguistic Interest, weighted negatively. Therefore, this statistical function appears to separate functional groups according to specialization interests and socio-economic level of occupation.

The ten occupational groups were plotted according to their SVIB scores on the four discriminant functions derived by the analyses. Graphic representation of the separate analyses are presented in Appendix J. Figure 5, Page 36, attempts to approximate in two dimensions the multi-dimensional space for viewing jobs as interests provided by the four discriminant functions. Figure 5 shows a natural distinction of interests between the occupational groups of the media field. These distinctions are found to be related to four areas of interest: Organization Interest; General-Culture Interest; Technological Interest; and Science Interest. These areas appear similar to those defined by Roe (1956) and can be regarded as follows:

Area I. Organization (Administration): The media jobs in this group are those concerned primarily with the organization and efficient functioning of media organizations or media complexes. Good academic ability is probably required at upper levels followed by clerical ability and social ability. Mechanical ability is probably irrelevant at the upper levels but useful considering the technological orientation of the field. Psychomotor skills may become of increasing importance at the lower support levels (e.g., typing, key punching, etc.). The jobs included in this group by the present study were primarily at the upper levels. Some examples are: Director of Division of

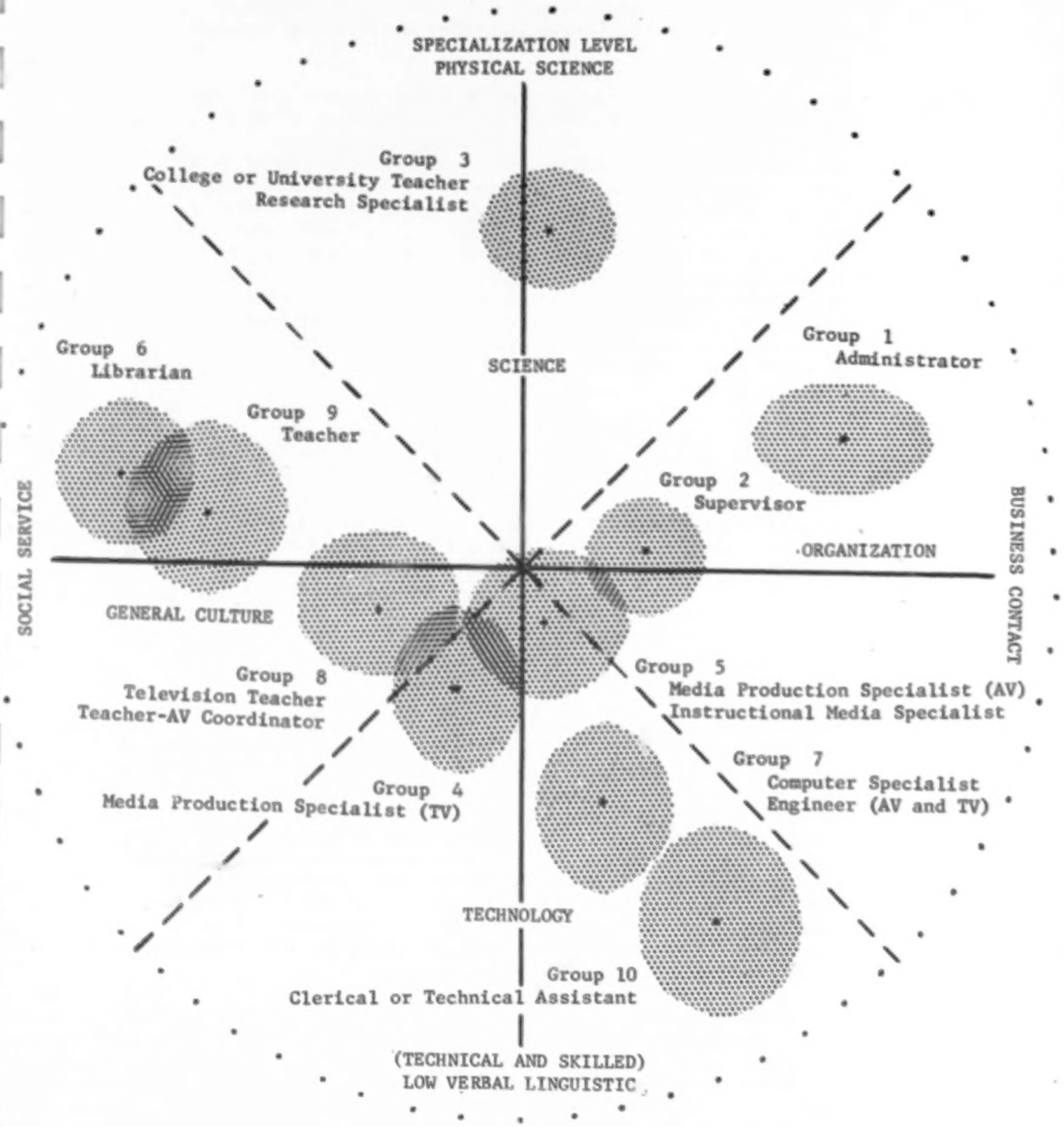

SPECIALIZATION LEVEL
PHYSICAL SCIENCE
Group 3
College or University Teacher
Research Specialist
SCIENCE
Group 1
Administrator
Group 6
Librarian
Group 9
Teacher
Group 2
Supervisor
SOCIAL SERVICE
ORGANIZATION
BUSINESS CONTACT
GENERAL CULTURE
Group 5
Media Production Specialist (AV)
Instructional Media Specialist
Group 8
Television Teacher
Teacher-AV Coordinator
Group 7
Computer Specialist
Engineer (AV and TV)
Group 4
Media Production Specialist (TV)
TECHNOLOGY
Group 10
Clerical or Technical Assistant
(TECHNICAL AND SKILLED)
LOW VERBAL LINGUISTIC

FIGURE 5. OCCUPATIONAL GROUPS BY MAJOR INTEREST AREAS

Instructional Services, Director of Learning Resources, Director of AV and ETV Services, Director of School Library Services.

Area II. Science (Research and Development): Jobs in this group are concerned with the development of communications science especially in regard to how to present instructional experiences, what should be presented, and what should be the mode of presentation. At the upper levels it includes all communications and learning research scientists, university and college communications and behavorial science faculties, and those whose professions are based on the application of scientific principles to the study of the structure and dynamics of knowledge. Lower level occupations in this group are all of a supportive nature. This area should become the "heartland" of the media field in that its activities are directed toward the understanding and control of the acquisition of knowledge.

Area III. Technology (Production and Distribution): The media jobs in this group are those concerned primarily with the development, production, maintenance and transportation of media materials and distribution and communication. Those trained in the arts belong in this group as well as those specifically trained in the communication sciences (application to technological situations) and engineering. (Those in University settings may belong in Group 4). Artistic work activities in this group include the creative expression of ideas, feelings, and moods in artistic designs, objects and arrangements. Characteristically, the visual and graphic art activities in the media field are concerned with the creation and reproduction of educational designs and materials. These activities require adherence to specifications developed to maintain the educational integrity of the reproduction. Those concerned with the arts (scenic design, graphic arts, photography) require superiority in some of the specialized abilities of artistic judgment concerning harmony of color and line; eye-hand coordination, and finger and manual dexterity to paint or draw and to use hand tools when working with plaster, clay, and other materials; color discrimination is required to perceive differences in hue, shade and value; and special aptitude to visualize and depict three dimensional objects and arrangements in two dimensions is necessary. Specialized skill such as lettering, illustrating, or typography are important.

Engineering work activities in this group primarily involve the setting up and/or adjusting of machines or equipment that are automatic. Activities also involve starting, adjusting, watching and stopping complex monitoring and transmission equipment. They also include the employment of "trouble-shooting" techniques in the correction of malfunctions of defective equipment or systems. The functions of tending and operating equipment are common to the lower level jobs in this group. At most

2

levels, spatial visualization, manual and finger dexterity, ability to understand and follow instructions and specifications, interest in machinery, ability to understand the functional nature of the machine and ability to visualize the relationship of the parts of the equipment is essential.

Area IV. General-Cultural (Utilization): Jobs in this group are closely related to the arts in the preceding group because of the cultural aspects and to jobs in service occupations such as nursing, medicine, etc., because of the social service interest factor. This group ordinarily includes educational administrators, librarians, teachers, etc. This group as a whole shows some dominance of verbal over non-verbal abilities, a generally more feminine attitude and some tendencies toward low dominance. In general, the more successful among this group appear to be the more mature and those who are best adjusted to the prevailing cultural standards.

In an effort to determine whether or not vocational interests predict media group membership, classification chi squares were computed. The probability of group membership yielded 47.3% hits for Sample 2, and 34.8% hits for Sample 3, the cross-validation sample. (See Table 10, Page 51.) (The diagonal cell entries in Table 10, i.e., from upper left to upper right, are the correct classifications.) In both samples this is somewhat better than chance alone, roughly 10% correct classifications. Most misclassifications in the cross-validation sample result from a confusion of groups 2, 8 and 9.

The above analyses provide some empirical proof that measures of vocational interest (here, the SVIB variables) contain information separating the occupational groups within media personnel. The broad areas of Organizational Interest, General-Cultural Interest, Technological Interest, and Scientific Interest are important factors for distinguishing these groups. It should be noted that the relationships of group membership and group characteristics are somewhat different whether we look at job activities variables or vocational interest variables. The results of this analysis suggest that the job as interest is another important dimension for describing the characteristics of jobs.

TABLE 10

OCCUPATIONAL GROUP CLASSIFICATIONS BASED ON SVIB PREDICTOR VARIABLES

Hits and Misses for Sample 2

N=203

ACTUAL

PREDICTED	1	2	3	4	5	6	7	8	9	10	Number in Occup. Group
1	4	2	1	1		1					9
2	1	11	1	1	3	5	4	4	1		31
3			7	1							8
4		1		3	3	1	2		1		11
5	1	2	1		6	5	1	5			21
6		3			2	24	1	2	4		36
7		1	1	1	1		9	3	1	1	18
8	1	3	2			2	2	14	4		28
9		4			3	7	1	3	10	1	29
10					1	1		1	1	8	12
	7	27	13	7	19	46	20	32	22	10	203

47.3% hits

CROSS-VALIDATION OF OCCUPATIONAL GROUP CLASSIFICATIONS BASED ON SVIB PREDICTOR VARIABLES

Hits and Misses for Sample 3 (Cross-Validation Sample)

N=112

ACTUAL

PREDICTED	1	2	3	4	5	6	7	8	9	10	Number in Occup. Group
1		1	1						1		3
2	2	9	3	1	1	6	2	6	2		32
3			1	1							2
4			1				2	1			4
5		1	1		2			2	1	1	8
6		4		1	3	22		2	1	3	36
7							3	1	1		5
8		1			2	4		2			9
9		2	1		2	4					9
10		1				2	1				4
	2	19	8	3	10	38	8	14	6	4	112

34.8% hits

F. Quantitative and Qualitative Analyses Using Job Incentive Data

The purpose of this analysis was to test the following hypothesis:

> Measures of factors influencing job satisfaction contain information distinguishing the performance functions of different jobs in the media field. A list of verbal descriptions of job incentives used in previous studies, (Fine, 1962) (Levin and Martin, 1963) was prepared and several incentives were added for the purposes of the study. The 36 items making up the scale were limited to those applicable to educational personnel. The list included items that were expected to measure factors about self (self realization, self respect), social status (self esteem, recognition of status) and economic status (shelter, material security) as related to Maslow's hierarchy of needs. These items also reflect Herzberg's theory of job context conditions, i.e., those conditions which contribute to a feeling of satisfaction, but do not contribute to a positive attitude associated with productivity and job productivity conditions, i.e., those conditions which contribute to the positive attitudes that lead to productivity. On an a priori basis, these items might also be expected to measure the hypothesized "need achievement versus fear of failure" factors proposed by Bendig (1958) as suggested by the work of McClelland, et al (1953).

The scale was administered to the 148 media personnel in Sample 1. A factor analysis of inter-correlations among the items yielded five distinguishing factors (three of which were moderately correlated). These factors were tentatively identified as Personal Status, Work Environment, Material Security, Personal Security, and Purpose and Location of Organization. The Self Realization factor found previously to be important in distinguishing occupational groups did not appear in this analysis. This factor is defined by such items as: (1) Opportunity for advancement to more responsible work (2) Feeling that I'm paid on the basis of individual merit (3) Opportunity to apply my education and experience. Individual scores for the five factors isolated for Sample 1 were computed and significant differences were found among the nine media occupational groups in Sample 1. The job incentive analysis indicated that the incentives of Personal Status, Personal Security and Purpose and Location of Organization separated functional groups into those concerned with administration, professional services (e.g., teachers and librarians) specialized services (e.g., TV production personnel) and clerical and technical assistants.

The following scales for the job incentives scale resulted from this initial analysis and subsequent item analyses. The scales are (1) Self Realization (2) Personal Status (3) Material Security (4) Personal Security (5) Purpose and Location of Organization. The items defining these scales are given in Table 11, Page 53. The scale reliabilities (Kuder-Richardson 20) were .67, .72, .72, .73 and .50 respectively.

Individual scores for the five scales developed were computed for Sample 2, N=220, and significant differences were found among the ten occupational groups. Table 12 lists the F ratios for the five job

Table 11

JOB INCENTIVE SCALES

Scale 1 - Self Realization

Item	Description
1	Opportunity to apply my education and experience
10	Opportunity for advancement to more responsible work
15	Feeling that I'm paid on the basis of individual merit
26	Evaluation of performance
31	Creative environment
32	Recognition of achievement
19	Relative freedom to develop ideas in which I believe

Scale 2 - Personal Status

17	Adequacy of materials and supplies
5	Status of organization in community
7	Technical or professional competence of associates
11	Adequacy of facilities
13	Opportunity for travel
14	Status of my profession
6	Opportunity for contacts with other specialists
38	A well-run and coordinated organization

Scale 3 - Personal Security

28	Education and training opportunities in connection with job
30	Emphasis on high standards of competence
16	Supervising help when needed
24	People I get to know in connection with my organization, profession or work
27	Recognition of years of service
31	Working with a particular person or group of people
23	Seniority system
25	Organization structure and facilities to carry out ideas

Scale 4 - Material Security

4	Opportunity to obtain personal rights to work
2	Fringe benefits
3	Size of annual vacation
8	Amount of wage or salary
9	Level of wage or salary as compared to other positions
18	Payment of tuition and time off for courses
20	Physical working conditions
21	Hours of workday
29	Amount of time required outside of working hours

Scale 5 - Location and Purpose of Organization

12	Location of organization
33	Contribution to educational needs
34	Participation in scientific research
35	Working for a non-profit organization
22	Size of organization

JOB INCENTIVES DATA

Table 12

Variables	Group Means										F Ratio		Scaled Vectors			
	Organization/ Administration		Research & Development	Instrumentation/ Production				Utilization/ Operation		Support	F^{9}_{210}	P.	1	2	3	4
	1	2	3	4	5	7	8	6	9	10						
1 Self Realization	10.30	10.78	12.38	10.55	11.09	10.12	10.79	11.22	10.47	10.62	0.85	0.5	-0.65	0.46	0.17	0.52
2 Personal Status	11.40	11.64	9.88	9.27	12.18	9.00	11.96	11.69	11.43	9.31	2.91	0.002	0.57	-0.00	-0.75	0.38
3 Personal Security	10.90	11.94	11.13	9.45	12.68	9.71	12.07	12.53	12.23	12.08	1.94	0.04	0.37	-0.13	0.18	-0.73
4 Material Security	6.40	7.78	8.38	6.45	8.41	7.88	10.00	9.56	8.63	8.62	2.30	0.01	-0.05	-0.75	0.36	0.22
5 Location and Purpose	4.80	5.14	5.88	3.09	5.73	3.59	5.14	5.44	5.23	5.62	3.31	0.0009	0.34	0.46	0.49	0.07

TABLE 13

OCCUPATIONAL GROUP CLASSIFICATIONS BASED ON JOB INCENTIVE DATA

Hits and Misses for Sample 2

N=220

ACTUAL

PREDICTED	1	2	3	4	5	6	7	8	9	10	Number in Occupational Group
1	3	3	1		1	1			1		10
2		22			1	8	1	2	2		36
3		3	3			2					8
4		5	1	1			2	1		1	11
5	1	8			3	5		2	1	2	22
6	1	12	1		2	20	1	7	1		45
7		2		1		4	8	2			17
8		8			1	7	1	10	1		28
9	2	9	1	1	3	6	2	4	2		30
10				1	1	4		2	1	4	13
	7	72	7	4	12	57	15	30	9	7	220

34.5% hits

CROSS-VALIDATION OF OCCUPATIONAL GROUP CLASSIFICATIONS BASED ON JOB INCENTIVE DATA

Hits and Misses for Sample 3 (Cross-Validation Sample)

N=108

ACTUAL

PREDICTED	1	2	3	4	5	6	7	8	9	10	Number in Occupational Group
1						2			1		3
2	1	14	1	1	1	8	2		2	1	31
3		1				1					2
4		1		1		1		1			4
5		3			1	1	1		1	1	8
6		10	1		3	13	2	4		1	34
7						1	1	1		2	5
8		4				1		2	2		9
9		5			1	1		2			9
10		1				1				1	3
	1	39	2	2	6	30	6	10	6	6	108

30.5% hits

incentive scales used and indicates which variables discriminate different occupational groups for Sample 2. The values given are for a one way analysis of variance within the ten groups. The following variables are discriminating the groups since these are the variables having F ratios with probabilities less than .05: (2) Personal Status (3) Personal Security (4) Material Security and (5) Purpose and Location of Organization. The roster of group means, Table 12, Page 54, shows which groups are high and which groups are low on each job incentive scale.

Taking Scale 1, Self Realization, we see that Research and Development Specialists are discriminated from the other groups on this variable. Taking Scale 2, Personal Status, we see that Research and Development Scientists, Television Production Personnel, Engineers, and Clerical and Technical Assistants are low on this scale. Taking Scale 3, Personal Security, we see that Instructional Media Specialists, Teacher-AV Coordinators, Librarians, Teachers, and Clerical and Technical Assistants are high on this variable while Administrators, Television Production Personnel are low. Taking Scale 4, Material Security, we see that Administrators and Supervisors are low while Teacher-AV Coordinators, Librarians, Teachers, and Clerical and Technical Assistants are high. Taking Scale 5, Purpose and Location of Organization, we see that TV Production Personnel and Engineers are low while the other groups are high.

Table 12, "Scaled Vectors," gives the list of Job Incentive Scales used to define factors that influence the job satisfaction of media personnel and their respective "weights" for functions 1 through 4.

In an effort to determine whether or not vocational interests predict media group membership, classification chi squares were computed. The probability of group membership yielded 34.5% hits for Sample 2 and 30.5% hits for Sample 3. (See Table 13, Page 55.) Again this is somewhat better than chance alone, roughly 10% correct classifications. Most misclassifications in the cross-validation sample (Sample 3) result from a confusion of groups 2, 6 and 9.

This job incentive analysis indicates that the job incentives relating to Self Realization, Personal Status, Personal Security, Material Security and Purpose and Location of Organization separate functional groups according to the broad areas of Administration and Organization, General-Cultural, Technology, and Research and Development in a similar manner to the SVIB variables. It can be concluded that factors influencing job satisfaction are an important aspect of the functional requirements of jobs in the media field.

G. Preliminary Critical Performance Requirements for Media Personnel

From occupational groups of media personnel, 587 critical performance incidents were collected. (The questions used to elicit the critical incidents are given in Appendix D.) Table 14, Page 59, lists the groups of job titles of respondents, along with the number of incidents received from each group. It may be seen that the respondents fill an extraordinary range of jobs from librarian to television producer, and from computer programmer to classroom teacher. All of them, however, have some direct concerns and responsibilities with instructional media in education.

These incidents were pooled into functional areas in the initial analysis and then sorted into categories representing similar job performances by procedures usual in applications of the critical incident technique. An attempt was made to allow the category scheme to flow from the incidents, rather than from preconceived ideas of the analysts. The analysts were especially concerned with clarifying educational implications of the different performance categories derived. Significant incidents are descriptions of effective and ineffective performances by individuals in an occupation. The collection of such descriptions supplies important information concerning an occupation or profession from a larger number of individuals than would be possible by observation interviews alone. Their greatest value is in calling attention to certain problems in the work situation which might not be noticed through other methods. Significant incidents have been used to develop criteria for job definitions, personnel selection and training program content.

The critical performance categories are presented in outline form in Table 15, Page 60 , along with numbers of effective and ineffective incidents reported in each category. Table 16, Page 61 , shows the numbers of incidents in the categories contributed by the various job groups. The complete set of critical requirements with verbal descriptions of the areas and the categories appears as Table 17, Page 62 . Sample incidents were included in some categories for clarification.

The total number of incidents was clearly not enough to permit the development of a complete and definitive category scheme. On the contrary, the scheme is quite preliminary and incomplete. Several limitations of the work should be emphasized:

1. The number of incidents would not be expected to be sufficient for development of a reliable category scheme, even in the case of a relatively homogeneous occupational group. With such a broad range of jobs as were represented in this case, several thousand incidents would be required for adequate definition.

2. The incidents were not all of high quality. Some of them failed to describe behavior. Others missed the point by describing the behavior of the respondent's superior or a School Board, rather than the respondent himself. Many lacked sufficient detail to allow accurate analysis.

3. The questions eliciting the incidents did not specify that incidents should necessarily deal with audiovisual aspects of respondents' jobs, but rather encouraged reporting of a broad range of job-related performance. Since many of the

respondents (such as classroom teachers) do not deal primarily with audiovisual materials as such, many of the incidents did not have to do with audiovisual matters. These incidents were nevertheless categorized.

4. The level of effort devoted to development of the category scheme was not sufficient to permit adequate refinement. It would be highly desirable to have the scheme reviewed by instructional media specialists and educators familiar with the field. However, such a review was not feasible or justified in this brief effort.

Despite the above limitations, it appears that the categorization of the incidents has been a useful exercise. A careful review of Table 17 should provide a number of suggestions for subject matter and organization of training courses for instructional media specialists. The distribution of incidents across categories in Table 17 suggests (in a very tentative way, of course) that there is at least some degree of commonality among the jobs, and hence that some types of training might be useful to all.

The results here suggest that it should be possible to define rather comprehensively and definitively the performance of the range of occupations within the media specialities. A more complete study of this type would modify the critical incident questions, and would perhaps use other techniques to supplement the critical incident technique. Such a study might make it possible to identify clusters of job activities which would define more rational job entities than those which are presently used. It would permit the identification of areas of emphasis of each type of job, and would suggest training needs. It could contribute toward the development of educational objectives, curricula, and training methods for persons who wish to be prepared to work in one of the challenging instructional media specialities.

Table 14

DISTRIBUTION OF INCIDENTS BY OCCUPATIONAL GROUP

	Functional Area	Occupational Group Identification	No. of Incidents
Group 1	Administration of Media	Administrator (Media)	31
Group 2	Supervision of Curriculum/ Development of Media	Supervisor of Curriculum/ Instructional Materials	115
Group 3	Teaching for the Use of Media	College or University Teacher	2
Group 4	Research and Development of Media	Research Specialist	12
Group 5	Television Production	Media Production Specialist (TV)	34
Group 6	Audiovisual Production	Media Production Specialist (AV)	20
Group 7	Distribution/Production of Media	Instructional Media Specialist (IMS)	42
Group 8	Distribution of Printed Materials	Librarian (Lib.)	126
Group 9	Distribution/Computers	Computer Specialist (Comp.)	3
Group 10	Distribution/Audio or Video Transmission	Engineer (AV or TV)	25
roup 11	Television Teachers	Teacher (School or College)	8
Group 12	Utilization of Media	Teacher (School or College)	78
Group 13	Utilization/Distribution/ Production of Media	Teacher - Principal	69
Group 14	Assisting in the Use of Media	Clerical and Technical Assistants	22
			587

TABLE 15

SUMMARY OF PRELIMINARY CRITICAL PERFORMANCE REQUIREMENTS FOR INSTRUCTIONAL MEDIA PERSONNEL

	Effective Incidents	Ineffective Incidents
I. RECOGNIZING EDUCATIONAL NEEDS AND PROBLEMS	(18)	(18)
A. Using and Interpreting Outcome Measures	7	1
B. Observing Student and Teacher Difficulties	3	3
C. Judging Adequacy of Plans and Aids	8	14
II. IDENTIFYING APPROPRIATE AUDIOVISUAL METHODS AND MATERIALS	(23)	(18)
A. Knowing What Materials Are Available	6	2
B. Recognizing Capabilities and Limitations of Implementers	2	8
C. Selecting Materials Appropriate to Audience	5	5
D. Selecting Materials Relevent to Educational Objective	10	3
III. APPLYING AUDIOVISUAL METHODS APPROPRIATELY	(68)	(55)
A. Working with Students and Teachers in Applying Aids	35	15
B. Understanding Subject Matter	2	1
C. Observing Principles of Teaching	16	20
D. Using Equipment and Techniques Expertly	15	19
IV. DEVELOPING AUDIOVISUAL AND RELATED MATERIALS	(55)	(6)
A. Using Ingenuity in Designing New Materials	21	1
B. Adapting Available Materials to Training Needs	20	0
C. Maintaining High Level of Technical Quality	14	5
V. COMMUNICATING EFFECTIVELY	(40)	(38)
A. Maintaining Good Relations with Others	7	8
B. Persuading and Motivating Others	20	20
C. Demonstrating Audiovisual Methods Effectively	13	10
VI. PLANNING AND ADMINISTERING PROGRAMS	(73)	(86)
A. Planning Programs	18	27
B. Administering Programs	15	21
C. Developing and Maintaining Accurate Inventory and Retrieval Systems	26	22
D. Acquiring and Maintaining Equipment and Materials	14	16
VII. SUPERVISING EFFECTIVELY	(24)	(36)
A. Selecting and Assigning Personnel	7	8
B. Effectively Using and Supervising Subordinates	11	19
C. Effectively Using Student Help	6	9
VIII. ACCEPTING RESPONSIBILITY	(25)	(4)
A. Showing Willingness to Devote Extra Effort	14	2
B. Maintaining Competence and Developing New Skills	11	2
TOTALS	326	261

Table 16

DISTRIBUTION OF INCIDENTS WITHIN THE CLASSIFICATION SCHEME BY RESPONDENT'S OCCUPATIONAL GROUP

Occupation / Classification Scheme Category	I. Recognizing Educational Needs and Problems	A. Using and Interpreting Outcome Measures	B. Observing Student and Teacher Difficulties	C. Judging Adequacy of Plans and Aids	II. Identifying Appropriate Audiovisual Methods and Materials	A. Knowing What Materials are Available	B. Recognizing Capabilities and Limitations of Implementers	C. Selecting Materials Appropriate to Audience	D. Selecting Materials Relevant to Educational Objective	III. Applying Audiovisual Methods Appropriately	A. Working with Students and Teachers in Applying Aids	B. Understanding Subject Matter	C. Observing Principals of Teaching	D. Using Equipment and Techniques Expertly	IV. Developing Audiovisual and Related Materials	A. Using Ingenuity in Designing New Materials	B. Adapting Available Materials to Training Needs	C. Maintaining High Level of Technical Quality	V. Communicating Effectively	A. Maintaining Good Relations with Others	B. Persuading and Motivating Others	C. Demonstrating Audiovisual Methods Effectively	VI. Planning and Administering Programs	A. Planning Programs	B. Administering Programs	C. Developing and Maintaining Accurate Inventory and Retrieval Systems	D. Acquiring and Maintaining Equipment and Materials	VII. Supervising Effectively	A. Selecting and Assigning Personnel	B. Effectively Using and Supervising Subordinates	C. Effectively Using Student Help	VII. Accepting Responsibility	A. Showing Willingness to Devote Extra Effort	B. Maintaining Competence and Developing New Skills	Total
1 Administrator (Media)	3			3						3	1	1	1		2		1	1	13	2	7	4	5	3		1	1	3	3			2		2	31
2 Supervisor of Curriculum/ Instructional Materials	13	5	1	7	6	3	1		2	7	3			4	8	2	1	5	15	4	5	6	45	18	13	10	4	17	7	8	2	4	2	2	115
3 College or University Teacher	1			1																			1				1								2
4 Research Specialist	1	1			1				1						2	1		1	1		1		3	2		1		1		1		3		3	12
5 Media Production Specialist (TV)					1		1			12			2	10	7	4		3	1		1		6	2	1		3	6	1	4	1	1		1	34
6 Media Production Specialist (AV)	2	1		1	2	1	1			4	1	1		2	7	4	1	2	1			1	4	2	1	1									20
7 Instructional Media Specialist (IMS)					5	1	2	1	1	6	3		1	2	1			1	6	1	3	2	14	3	3	7	1	6	1	5		4	2	2	42
8 Librarian (Lib.)	4		1	3	7	1	1	1	4	38	31		4	3	7	4	3		20	5	12	3	32	8	9	10	5	12	1	4	7	6	6		126
9 Computer Specialist (Comp.)										1				1									2			2									3
10 Engineer (AV or TV)										5				5	6	2	1	3					9		2		7	3	1	2		2		2	25
11 Teacher (School or College)					4		2		2						2	1	1						1	1				1		1					8
12 Teacher (School or College)	9		4	5	10	3	1	5	1	28	4		20	4	11	2	8	1	7	1	4	2	6	2	2	1	1	3		3		4	3	1	78
13 Teacher - Principal	3	1		2	4		2		2	16	6	1	8	1	7	2	4	1	13	2	7	4	20	3	4	7	6	4		1	3	2	2		69
14 Clerical and Technical Assistants					1			1		3	1			2	1			1	1			1	11	1	1	8	1	4	1	1	2	1	1		22
Total	36	8	6	22	41	8	10	10	13	123	50	3	36	34	61	22	20	19	78	15	40	23	159	45	36	48	30	60	15	30	15	29	16	13	587

TABLE 17

PRELIMINARY CRITICAL PERFORMANCE REQUIREMENTS FOR INSTRUCTIONAL MEDIA PERSONNEL

Area I. Recognizing Educational Needs and Problems

The three categories in this area:

A. Using and Interpreting Outcome Measures
B. Observing Student and Teacher Difficulties
C. Judging Adequacy of Plans and Aids

are concerned with the recognition of problems associated with existing and new teaching programs, and the establishment of goals and program plans to overcome these problems.

Category Descriptions

A. Using and Interpreting Outcome Measures. Evaluation of the effectiveness of teaching methods may range from content testing for material assimilated by students to a thorough analysis of the needs of a particular student. Incidents in this category include the administration and analysis of classroom quizzes; testing children with reading problems to determine their specific deficiencies; establishing evaluation procedures for television lesson content; the development and application of statistical techniques, utilizing computer facilities; and the establishment of special groups to evaluate achievement.

Sample Incident

Effective: Children with reading problems were tested to determine the specific areas of difficulty for each child.

B. Observing Student and Teacher Difficulties. Incidents in this category relate to the identification of specific difficulties of students in learning subject matter. Several incidents deal with difficulties encountered by students in foreign language studies, especially pronunciation and grammar usage. Also included are observed difficulties of teachers.

Sample Incident

Effective: Students were having difficulties in Spanish pronunciation. The teacher explained each vowel and consonant, pronounced them, and prepared pronunciation aid materials for student notebooks.

C. Judging Adequacy of Plans and Aids. This category involves evaluating current plans and aids effectively, with a view to establishing effective educational goals, objectives, and plans.

Area II. Identifying Appropriate Audiovisual Methods and Materials

When preliminary plans are made for using audiovisual materials to solve education problems, specific methods and materials need to be chosen. The categories in this area:

A. Knowing What Materials are Available
B. Recognizing Capabilities and Limitations of Implementers
C. Selecting Materials Appropriate to Audience
D. Selecting Materials Relevant to Educational Objective

deal with the skills and knowledge required to select audiovisual programs appropriate to the educational problem.

Category Descriptions

A. Knowing What Materials Are Available. This category includes knowledge of existing teaching materials and aids and the ability to seek out and acquire relevant materials for the problem identified. Incidents here include becoming acquainted with aids through previewing; reading teachers guides and manuals accompanying aids; seeking out new aids (records, books, etc.) relevant to the subject matter; utilizing other resources to learn about materials; recognizing and utilizing the talents of better students for class demonstrations.

Sample Incident

Effective: An in-service meeting was held on a typical urban school grounds to motivate teachers to use the out-of-doors to teach science more effectively. Teachers took a "capsule" field trip to observe and explore, many seeing for the first time varied leaves and other natural phenomena that are in the environment of their own school grounds.

B. Recognizing Capabilities and Limitations of Implementers. A factor influencing the selection of materials is the ease with which the materials can be prepared and presented by the implementer. Familiarity with and practice in using certain equipment and materials may be a prerequisite for the effective preparation and presentation of materials. The ability to make presentations before an audience or before a television crew may be necessary. Selection of instructors or guests for public or television appearances requires assessment of this ability as a prerequisite. A third factor to be considered is the ability of the implementer to gear his presentation to the level of his audience. Although he may be well versed in the subject matter to be presented, he may not be able to present the material at the level of sophistication of his audience. Finally, it appears that presentation techniques differ enough among the various media (i.e., television, classroom, library use) that certain fundamentals must be mastered for each media.

Sample Incident

Ineffective: A guest was needed to assist in a television class presentation. The respondent selected an individual although previously warned by the director that this guest was extremely tense before a camera. This tenseness reduced the effectiveness of the presentation.

C. Selecting Materials Appropriate to Audience. The audiovisual specialist must consider the audience in selecting materials. The difficulty and sophistication of materials should be adjusted to the age, interests, achievement levels, and special problems of the learners.

Sample Incident

Effective: A program was started to improve the reading ability of low achievement students. A new phonics reading method using text films was selected for this group.

D. Selecting Materials Relevant to Educational Objective. This category involves knowledge and judgment in selecting materials which are germane to the desired educational objectives, rather than merely interesting.

Sample Incident

Effective: In order to more effectively select films and filmstrips, the education group has established a previewing committee to work with the county curriculum directors.

Area III. Applying Audiovisual Methods Appropriately

This area deals with the appropriate application of audiovisual methods in the classroom and other situations. Categories here are:

A. Working with Students and Teachers in Applying Aids
B. Understanding Subject Matter
C. Observing Principles of Teaching
D. Using Equipment and Techniques Expertly

Skills and knowledge in the above categories reflect the individual's ability to adopt and apply audiovisual materials expertly to specific educational contexts.

Category Descriptions

A. Working with Students and Teachers in Applying Aids. In this category are included instances in which the audiovisual specialist works effectively with others to guide, motivate, and coordinate their efforts to teach and learn with audiovisual aids.

Sample Incident

Effective: A new approach for teaching chemistry using library materials instead of a text was being tested. The teacher and librarian surveyed existing library materials and discussed additional needs for the class.

B. Understanding Subject Matter. In applying audiovisual methods, the specialist must understand the subject-matter area fairly well. It may be necessary to make special efforts to become familiar with the subject in a relatively short time.

C. Observing Principles of Teaching. The audiovisual specialist must be an effective teacher. Principles of teaching, or of effective instructional technology, must be observed in the application of audiovisual methods.

Sample Incident

Ineffective: One segment of a biology class telecast was a close-up of a heart dissection. Although the close-up shot was good, the student saw a reversed image. A more effective shot could have been made by shooting into an overhead mirror, giving the student the same view of the heart as the instructor.

D. Using Equipment and Techniques Expertly. Included here are instances of good and poor practice in selecting equipment, operating equipment, overcoming technical difficulties, and seeking advice on technical problems.

Sample Incident

Effective: An instructor was presenting a television lesson. He had a cold and was coughing frequently during the presentation. The respondent, an engineer controlling the audio portion of the transmission, was able to eliminate the loud coughs from the transmission by carefully watching the instructor and turning down the microphone input each time he coughed.

Area IV. Developing Audiovisual and Related Materials

This area is concerned with the knowledge and skills related to the production of audiovisual materials. Categories in this area are:

A. Using Ingenuity in Designing New Materials and Techniques
B. Adapting Available Materials to Training Needs
C. Maintaining High Level of Technical Quality

These categories emphasize artistic and technical skills.

Category Descriptions

A. Using Ingenuity in Designing New Materials and Techniques. Often the audiovisual specialist is faced with a training requirement for which no available materials are appropriate. He must then be creative and original in producing ideas for apt and interesting materials.

Sample Incident

Effective: Children were finding it difficult to locate "do" when using sharps or flats. A large staff was made of 54" vinyl on which the children could walk. Removable sharps, flats, and notes were made. The children were able to locate "do" for each key by walking on the lines and spaces of the staff.

B. Adapting Available Materials to Training Needs. Many audiovisual and other materials can be adapted to make them more suitable for specific educational needs and contexts. In some cases, the application is unexpected and original, but the important thing is that it be appropriate.

Sample Incident

Effective: In a physical science class, the question came up as to what are "sound movies." An oscilloscope and microphone were used to show what sound movies might look like if we could see them, resulting in a better understanding of sound and how it travels.

C. Maintaining High Level of Technical Quality. Many audiovisual specialists work in highly specialized areas; e.g., television producer, computer programmer, artist. The quality of work in each such technical specialty must be high, despite the additional demands made for adaptation to educational requirements.

Sample Incident

Ineffective: A teacher wanted 36 pieces of typewritten material photographed and made into transparencies. The respondent noted that the clearness and aspect ratio of the print was less than ideal; but, because the materials were needed in a few days, he allowed the work to be photographed and the visuals made. The finished visuals, while readable, were of inferior quality because the print was neither as bold nor as large as it might be.

Area V. Communicating Effectively

This area is concentrated on interpersonal communication skills. Effective performance in this area includes organizing and writing skills, the ability to make effective public presentations and to be personally persuasive. The categories are:

A. Maintaining Good Relations with Others
B. Persuading and Motivating Others
C. Demonstrating Audiovisual Methods Effectively

Category Descriptions

A. Maintaining Good Relations with Others. Included here are responsiveness to the aims and desires of others, concern for good relations in the community and with fellow workers, and effectiveness in establishing and maintaining good relations.

Sample Incident

Ineffective: Films used by a certain teacher were receiving considerable damage. The respondent verbally assailed the teacher, condemned him as "stupid, unintelligent." This teacher never again used another film.

B. Persuading and Motivating Others. The specialist must be effective in influencing others to support and use audiovisual materials and facilities in constructive ways. He should be able to convince teachers and students to correctly use materials. He can often add to the effectiveness of his facilities by persuading his superiors and fund-allocating bodies to support the facilities adequately.

Sample Incident

Effective: There seemed to be dissatisfaction with instructional television in a specific school building. The respondent interviewed teachers and found the anti-television opinion leader. He talked with her and requested the opportunity to work with her. Finding her opinion based upon fear in using instructional television, he discussed with her the problems of instructional television and she has now accepted its challenges and is attempting to work with instructional television.

C. Demonstrating Audiovisual Methods Effectively. Included here are instances when specialists have succeeded or failed in showing the value of audiovisual aids and techniques by demonstrating them. Such a demonstration may constitute a preview of the materials to be used in teaching, or it may simply serve as an example of an effective presentation. In either case, the specialist must be sure that his presentations are especially well prepared and effective when they function as demonstrations of his techniques.

Sample Incident

Ineffective: Although a demonstration had been held showing teachers how to use a new overhead projector, teachers appeared to be reluctant to use it. This reluctance was primarily due to the work involved in preparing transparencies. Specific instructions on how transparencies could easily be prepared should have been included in the original demonstration.

Area VI. Planning and Administering Programs

This area is concerned with the organization, administration, and maintenance of audiovisual and related programs. The categories are:

A. Planning Programs
B. Administering Programs
C. Developing and Maintaining Accurate Inventory and Retrieval Systems
D. Acquiring and Maintaining Equipment and Materials

Category Descriptions

A. Planning Programs. This category deals with the planning and organizing functions of audiovisual programs. Incidents in this category focus on providing administrative direction for major policy and operations decisions; establishing organizational procedures and regulations; responsibility for advance planning of organizational goals; developing plans for the implementation of organizational goals (i.e., establishing programs, planning personnel and facility requirements, funding program activities); and coordinating and integrating audiovisual programs with other organizational programs.

Sample Incident

Effective: The Division of Instructional Service is responsible for developing audiovisual needs and plans. In planning a new school, the Division has been able to work directly with the architect throughout the project, as well as with the district's own building department. The result is a plant whose design and equipment comes close to accommodating the functions to be performed.

B. Administering Programs. This category is concerned with the day-to-day operation of audiovisual programs. Incidents sorted into this category deal with knowing and observing organizational procedures and regulations; establishing procedures for accomplishing routine tasks; and scheduling and organizing meetings and activities. Behavior reflected in carrying out administrative duties included attending to details; efficiently organizing activities and assigning task priorities; maintaining flexibility in scheduling activities; and coordinating activities.

Sample Incident

Ineffective: A department on campus decided to do a slide series for duplication and wide distribution to other universities. Several rather uncoordinated units proceeded to run off madly in several directions, with a minimum of communication, reproducing and titling slide material. The responsibility for the project seemed to change hands at every term; slides became misplaced; titles were changed at random. Finally the slide approach was abandoned in favor of a 16 mm. filmstrip and several second-rate filmstrip projectors were purchased rather ill-advisedly. This project should have been under the supervision of one coordinator, with slide reproduction the responsibility of the photographic unit and the titling handled by another unit.

C. Developing and Maintaining Accurate Inventory and Retrieval Systems. If educational materials are to be useful, they must be available. Many specialists are responsible for keeping track of materials and finding them when they are wanted. In some cases, it is merely necessary to take care in maintaining an inventory and retrieval system which is established and functioning well. In other cases, it is important to adapt, modify, or even develop a system or some part of a system, keeping in mind such matters as budget, space, personnel, and user needs.

Sample Incident

Ineffective: Filmstrips were taken from several schools to be pooled into a central library, expecting to provide a better service for teachers by making available a greater variety of materials. The use of filmstrips has dropped off because teachers can no longer personally select the filmstrips.

D. Acquiring and Maintaining Equipment and Materials. The acquisition and maintenance of equipment and materials for audiovisual programs seem to be influenced by three considerations: funding difficulties; the need to establish measures for protecting equipment including preventive maintenance and careful handling procedures; and the development of technical competence to better determine the technical requirements of audiovisual systems. Funding problems include:

1. The necessity to compromise the quality of equipment purchased
2. Inability to secure adequate facilities for storage and repair of equipment, spare parts, and materials
3. The necessity to work with obsolete and substandard equipment

Several incidents report that equipment usage has been improved by the developing maintenance procedures, provided they are carried out on a regular basis by qualified, trained personnel. Effective performance concerning technical competence included demonstrating skills in developing specifications for new equipment, demonstrating the ability to trouble-shoot and repair complex systems such as those found in television studios, and the demonstrating ability to analyze these equipment systems to improve their operating characteristics.

Sample Incident

Effective: Routine maintenance of a language laboratory. The maintenance expenses for this laboratory have been under $100 per year during a four-year period. This has been accomplished by effectively training student help to perform routine preventive maintenance.

Area VII. Supervising Effectively

Selection, assignment, and control of subordinates and students are considered in this area. The categories are:

A. Selecting and Assigning Personnel
B. Effectively Using and Supervising Subordinates
C. Effectively Using Student Help

Category Descriptions

A. Selecting and Assigning Personnel. This category includes personnel selection and management functions. Incidents here consider the establishment of personnel requirements for various program needs; the mechanics of attracting applicants, evaluating their qualifications and credentials, and providing sufficient incentives for their employment; solving staff assignment problems, i.e., terminations, transfers, reclassifications of personnel; handling employee grievances, morale problems, and personal conflicts; and orienting and providing initial training for new personnel.

Sample Incident

Effective: There was a need to add two faculty members to teach instructional media. Several well qualified applicants were interested, but the existing positions (instructor level) were well below their level. The president of the college was persuaded to hire these well qualified applicants at a higher level.

B. Effectively Using and Supervising Subordinates. This category is applicable to those individuals having supervisory responsibility. Incidents sorted into this category deal with the establishment of work procedures and requirements; appropriately delegating work according to skills, experience, responsibility, and interests of personnel; following up, reviewing, and evaluating the performance of assignments; providing "professional" guidance and advice; providing technical and clerical support; providing in-service training; providing rewards and carrying out disciplinary actions; keeping subordinates informed; and providing support for authority delegated to subordinates.

Sample Incident

Effective: Supervisor assigned highly qualified programmer to work out major problems of difficult program, then assigned less qualified programmer to complete more time consuming but less challenging details of program.

C. Effectively Using Student Help. Incidents sorted into this category deal with the special considerations of using student help in audiovisual programs. Although the number of incidents in this category is small, the following considerations appear relevant to the use of student help:

1. Securing the cooperation of school officials and teachers in obtaining student help
2. Establishing adequate supervisory and guidance practices when using student help
3. Setting realistic goals for student assistance and providing the necessary training to meet these goals
4. Making student assistance a learning experience as well as a job experience for the student

Sample Incident

Ineffective: Students have trouble meeting the deadline for the library newspaper. Contributions are not always of the best quality and their results are a poorly done, hurry-up job. Students require closer supervision, more preparation for assignments.

Area VIII. Accepting Responsibility

This area is concerned with the motivation of the audiovisual specialist to expend extra effort in his work or in continuing the development of his audiovisual skills. The categories are:

A. Showing Willingness to Devote Extra Effort
B. Maintaining Competence and Developing New Skills
C. Observing Student and Teacher Difficulties
D. Judging Adequacy of Plans and Aids

Category Descriptions

A. Showing Willingness to Devote Extra Effort. The effective audiovisual specialist is sufficiently motivated that he spends extra time and effort to meet emergencies, to help his fellow workers, to improve the quality of outcomes, or to get the job done on time.

Sample Incident

Effective: Under the NDEA, several overhead projectors were bought with 5,000 foils and mounting materials as well as eight books of masters on different science and math courses. About thirty teachers spent a great deal of personal time mounting transparencies and learning to use the overhead projectors.

B. Maintaining Competence and Developing New Skills. Included here are instances of development or maintenance of skills through attendance at workshops or other professional meetings, enrollment in formal school courses, or self-study.

C. Observing Student and Teacher Difficulties. Incidents in this category relate to the identification of specific difficulties of students in learning subject matter. Several incidents deal with difficulties encountered by students in foreign language studies, especially pronunciation and grammar usage. Also included are observed difficulties of teachers.

Sample Incident

Effective: Students were having difficulties in Spanish pronunciation. The teacher explained each vowel and consonant, pronounced them, and prepared pronunciation aid materials for student notebooks.

D. Judging Adequacy of Plans and Aids. This category involves evaluating current plans and aids effectively, with a view to establishing effective educational goals, objectives, and plans.

H. Discussion of Results of Quantitative and Qualitative Analyses

In the course of the study, FJA variables were used as quantitative indicators for grouping jobs in the media field. Four broad areas of job responsibilities were outlined which were labeled: (1) Organization/Administration, (2) Research and Development, (3) Instrumentation/Production, and (4) Utilization/Operation. The groupings provided some confirmation of the two postulated dimensions of importance for providing a broad overview of jobs. These are: (1) Level of Complexity (process) and (2) Content of Work to be Performed (product). The results of these analyses show that FJA variables are reliable measures for differentiating occupational groups in that they provide a moderate degree of consistency in occupational group assignment. FJA variables, however, tend to be relatively independent of interest and job satisfaction measures in that different occupational groupings and assignments are obtained whether you are talking about interest variables, job satisfaction variables or FJA variables.

The analyses also confirmed two important dimensions for analyzing and separating vocational interests in the media field. These are: (1) Organization-Business Contact versus Social Service Interest and (2) Specialization Interest.

The analyses indicated five important job incentive dimensions, four of which have been found in other studies (Crites, 1961, Friedlander, 1963). These dimensions have been labeled: Self Realization, Personal Status, Personal Security, Material Security and Location and Purpose of Organization. These psychological variables now need to be articulated with the performance areas of the media field.

For the purposes of the present study, we can conclude that FJA variables may serve as a guide in defining jobs by identifying sets of functions which may be most suitably grouped. The groupings identified for the media field indicate that the present design of jobs in the media field does not represent a very rational job structure and that more rational job entities could be defined.

A representative sample of critical behaviors and problems faced by the occupational groups outlined were then analyzed. Categories of general educational objectives, i.e., CIT categories were formulated on the basis of this analysis. These objectives reflect a common set of performance standards for work in the media field. How these standards relate to education and training needs is of importance for curriculum development. Additional data must now be gathered for this purpose.

Admittedly, the study has not had recourse to very powerful techniques for making the above statements. In addition, methodological improvements must be made both in FJA and CIT studies to permit more objective analyses of changing job functions and more objective means of integrating these analyses. Until this is done, conclusions as to changing job requirements and necessary changes in education and training will be based to a considerable extent on the experience of the investigator rather than on exact techniques.

IV. IMPLICATIONS AND RECOMMENDATIONS

Following are four aspects of occupational information to be discussed that relate to the manpower concerns of the present study. They are:

1. With what occupations are we concerned?
2. What is new and what is obsolete in existing occupations in education relative to technological change?
3. What are the opportunities for technical and professional job development in the communication media occupations identified?
4. What are the education and training needs for the communications media occupations defined?

The first point is that, as more and more technological changes occur in instructional services to schools and colleges, the relationship between occupations in discrete work fields (i.e., TV, AV, Library, etc.) will diminish. One characteristic of this technological change is that more and more the same "systems communication" method can be applied by the same specialists to produce a greater and greater variety of instructional media services and products. Historically, print, non-print, television and programmed instruction developed along separate paths. There was a tendency for these occupations to be product-oriented and for each specialist to be a specialist in that product (e.g., film, TV programs, programmed instruction, etc.). Specialists are needed in education today, however, who can identify educational needs, select or aid in the design of specifications for materials relevant to those needs and "program" such materials into the curriculum. These specialists work in an area that has been designated as educational communications occupations. Furthermore, technicians who are employed to provide support functions for this area will rapidly gain skill in this cross-media occupational area.

The groups of related jobs indexed earlier indicate that several different jobs exist to accomplish the same purpose. In large or prototypic organizations, "systems communication" is done differently from the way it is done in a small organization. For example: In a small closed circuit TV operation, a teacher-producer-director, a part-time cameraman and a full-time or part-time engineer may have complete responsibility for broadcasts. In a large organization, highly skilled producers and directors will supervise a crew of trained engineers, cameramen, graphic artists and prop men. In a small school system, a teacher will have released time (sometimes "spare" time) to attend to the scheduling and delivery of AV materials and equipment and, in some cases, their maintenance and repair. In large or prototypic school systems, these same functions are performed by technicians and clerical assistants supervised by an instructional media specialist. In contrast, a wide variety of professional services are provided by this full-time specialist in these prototypic organizations. These activities may include:

(1) Working with curriculum supervisors in selecting and evaluating new media.
(2) Designing and producing effective audiovisual resources such as 16 mm.motion pictures, sound filmstrips, cross-media kits of related materials and study prints (with the assistance of production technicians).
(3) Giving presentations which involve classroom use of specialized equipment.
(4) Instructing teachers in the use of audiovisual aids (or those who are planning on the use of audiovisual aids for demonstration or lecture purposes).
(5) "Programming" multi-media presentations including the selection, preparation and integration of visual material into the curriculum.

Which of these jobs can we call "new" jobs and which can we call "obsolete". We can only speak of it as an example of a changing occupation. The material changes, the product changes (e.g., textbook to manipulable instructional sequences) and the technology changes (general-cultural exchange to application of psycho-technology to instruction and education). The term "obsolete" can only be applied to those specialists who do not change as their occupations change. The question can then be raised as to which of these are new jobs. The answer lies in the jobs that have been generated by the new technology and invention. Examples would include: The instructional media specialist; the educational communications research scientist; and the variety of technicians who are appearing to fill the gap between the skilled craftsman and these professional specialists.

The third point is that previous assessments of instructional media manpower requirements generally have been unreliable as well as unrealistic in calling for job qualifications rarely to be found in any one person. A whole new range of jobs, each associated with particular skills and knowledges can be identified. These jobs must now be clearly defined in order for the field to meet its new responsibilities. In examining the results of the present study, it is apparent that creative innovations could be made in designing media jobs. Tasks could be regrouped so that media personnel carry out the following clusters of jobs (These jobs represent the areas of greatest need):

Educational Technicians

Educational technicians are needed generally within the educational system for operation, maintenance and repair of materials and equipment. At present, teachers and instructional media specialists have too much responsibility for these technical tasks. Simple machine and planning tasks should be regrouped into definitive job descriptions, at the same time reorganizing curricula for training these personnel. These jobs would include AV technician, TV technician, language laboratory assistant, library technician and educational data processing technician. Any coding, compiling, computing, filing or typing should be performed by a clerical staff.

Data remains to be gathered on the complexity and range of jobs in this cluster in order to determine the exact nature of the technical requirements for these jobs; hence the skills and knowledge necessary for successful performance on the job.

The following kinds of jobs are being generated by the increased use of technology in education.

(1) With more computer installations there comes a need for total information systems to coordinate budget, personnel, student achievement records, etc. This calls for jobs such as:

Educational Data Processing Technicians
Computer Programmers
Systems Analysts

(2) With more computer based libraries and information retrieval systems comes the need for:

Library Technicians
Documentation Specialists

(3) Increased use of TV and AV centers as media complexes, learning resources centers and instructional material centers requires more:

TV and AV Technicians
Instructional Material Technicians

These jobs include: electronic technicians, cameramen, equipment technicians, photographers and graphic artists.

(4) New individual electronic learning centers call for more electronic technicians and additional media research centers require more research technicians. Personnel for these jobs need to be specially trained in order to insure the "educational integrity" of the media they produce.

Educational Specialists

Research and Development Specialists. Research and development in the educational media field must be supervised by suitably trained research personnel. Media research specialists should be trained in two areas: (a) applied research, i.e., developing materials and systems of materials and evaluating educational innovations and (b) basic research, i.e., conceptualizing and systematizing variables relevant to the educational communications process. Researchers need to synthesize one cohesive theory which will serve as a guide for choosing the appropriate media for a given instructional situation taking into account theories of learning and communication.

Educational Communications Specialists. Coordination of the production, distribution and use of media in schools and colleges should be the responsibility of individuals or teams of individuals whose primary concern is creating conditions optimal for learning, i.e., educational communications specialists to work cooperatively with educational personnel as well as supervise technical and clerical personnel. At present, decisions about the content of instructional materials for specific subject matter fields is the responsibility of subject specialists. This activity continues to recruit more and more scholars. These materials, once developed, must be used in conditions optimal for learning. Personnel described as "instructional media specialists" or "AV Coordinators" currently working in the field are the only media personnel who deal with media materials per se, and their job functions (as has been noted) are often at the "hardware" level of repairing and maintaining or scheduling equipment and materials. Only in special instances are they concerned with theoretical analyses of optimal learning conditions and the application of this knowledge to assist in the improvement of instruction. The following tasks should be the major focus of the job activities of educational communication specialists in considering the improvement of learning conditions:

1. Providing media with particular advantages for teaching particular task behaviors.
2. Providing materials and systems of materials for realizing particular terminal skills.
3. Providing materials or systems of materials effective for reaching students of varying capacities.
4. Providing interpretation of the results of instructional research for those teaching personnel in education who do not have such conceptual frameworks.

Educational communications specialists must be trained to handle the intellectual problems as well as the hardware problems involved in the media service functions described above. In addition, instructional media personnel should be capable of training teachers to use media according to explicit standards developed by research specialists.

Educational Managers

Educational Managers. Educational managers are needed who have the necessary knowledge and vocabulary for communicating to others what educational technology is, how it should be applied in specific situations and its significance for education and for effective individualization of instruction. Educational managers and educational supervisors are very similar in that they both get things done through others. The term supervisor, however, may be reserved for school or college personnel who supervise a number of individual specialists or workers but no other supervisors. The term manager (of instruction) may be generally used for higher-level educational supervisors who are removed from first-live supervision by at least one or two steps. The term administrator may be generally used for those whose primary area of responsibility is the providing of staff services to the educational manager and supervisors. As such, the educational administrator is responsible for assisting the manager or supervisor by providing a variety of administrative services such as personnel, maintenance and the like. In addition, those handling the administration and management of learning resources in schools and colleges need to establish formal channels of authority and communication through which they can carry out their programs.

The development of local and regional learning resource centers will create a great demand for educational managers. These centers, as conceived, will be responsible for the development, testing, production and distribution of multi-media materials needed in surrounding school or college settings. Each center will require a core of specialists and technicians.

As to our fourth point, the study has shown that a detailed description of critical tasks can provide general education objectives for the range of occupations in the media field. These objectives have been defined rather comprehensively by the following categories:

Recognizing Educational Needs and Problems
Identifying Appropriate Audiovisual Methods and Materials
Applying Audiovisual Methods Appropriately
Developing Audiovisual and Related Materials
Communicating Effectively
Planning and Administering Programs
Supervising Effectively
Accepting Responsibility

An attempt has been made to keep the critical requirements for the media field separate and distinct from the requirements for classroom teaching.

Our analysis shows that further delineation of education and training needs (e.g., specific course content, materials needed, etc.) will depend upon the gathering of more detailed task descriptive data for each of the broad categories of jobs identified. Analysis and development of this additional data should lead to improved predictions of necessary changes in education and training needs for the media field. Therefore, it is suggested that Phase 2 of the Instructional Media Resources Study investigate the many problems and issues involved in the education and training of the technicians, specialists and generalists in demand in education today. Methods to be used are those of general survey and observation, task description and analysis and a modified Critical Incident Study.

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Appendix A

Functional Job Analysis

Theoretical and Analytical Considerations

APPENDIX A

THEORETICAL AND ANALYTICAL CONSIDERATIONS FOR CURRICULUM RESEARCH

A. Theoretical Considerations

Fine's (1955) descriptive system for the analysis of human work functions is an operational scheme for defining broad classes of jobs based on a taxonomy of worker functions which has been tested empirically, keeping separate what the worker does (process) from what the job gets done (product). It has proven useful for distinguishing between and grouping tasks performed and for defining patterns of characteristics that are consistently associated with given patterns of functions. It should be noted that the system has not been developed on the basis of a theory of learning or performance.

Gagnè (1962) has proposed a set of basic human functions derived from analyses of input-output transformations in human behavior. These transformations, sensing, discriminating, remembering, deciding and choosing, which are psychological in nature, call for different kinds of learning. The relationships between these theoretical types of learning and skills and knowledges required for particular jobs have not yet been empirically determined. When a taxonomic structure of learning processes is constructed, it should provide an operational base for getting from performances to skills and knowledges.

A discussion of the concept of task taxonomy will clarify the further development of these theoretical positions.

Many investigators (Miller, 1962; Melton, 1964) who have been concerned with the problem of finding an ideal method for describing tasks or behaviors that comprise tasks have recommended the development of a set of categories that would permit any stimulus-response relationship found in tasks to be readily identified and labled. The resulting structure would be taxonomic for tasks and for behaviors. More importantly, as Miller notes, "The glossary of terms for the behavior taxonomy and the classification rubrics developed may well lead to the development of taxonomic structures for particular use in education, training and transfer of training and eventually may lead to the development of a taxonomy of learning processes."

A taxonomy is not merely a glossary of terms. Terms used in a taxonomy are formally related to each other and their relationships are made explicit by rules of exclusion and inclusion. For example, in Fine's taxonomy of worker functions the structure of relationships among the taxonomic categories is presented as follows (1955):

> "The structure consists of three hierarchies of functions pertaining to Things, Data, and People. The first two functions in each hierarchy are Observing and Learning. Successive functions in a hierarchy include all those that precede it and exclude all those that follow it. Thus, the relationship of a given function, say Compiling, to its immediately adjacent functions, Computing (above) and

> Analyzing (below), 'includes Computing (which in turn includes Copying, etc.) and excludes Analyzing.' This set of relationships is common in everyday experience and is similar to those delineated by a family tree, organizational chart, or grade structure of the educational system. It can easily be confused with an absolute skill hierarchy. This it is not. It merely establishes the relative position of what a worker does in a given line of work as it pertains to a given hierarchy."

In brief, each function in the taxonomy of worker functions reflects a homogeneous group of tasks involving either People, Data, or Things at increasing levels of complexity; the functions are independent of the particular technological setting.

A very fine piece of work by Mosel (1963) attempted to determine the extent to which a set of categories in the worker functions hierarchy can be described by simple theoretical models and hence, can depict the structure revealed. He concluded that the domain of worker functions does, to a large degree, constitute a strict partially-ordered set, and that man's work behavior, when analyzed in terms of the worker functions involved, does indeed possess a hierarchial type structure.

In comparison to the development of the concept of Worker Functions noted above, Gagné (1962) has attempted to categorize the basic types of human functions which were identified in psychological laboratory investigations. He recommends that, "in thinking about man in a systems framework, it is essential that one deal with functions rather than with the unitary events (stimulus-response relationships) that composd them.... Functions ...represent the initial, organized way which must be used to deal with human behavior in the framework of systems." The categories that he has derived are based on his investigations of the kinds of transformations that an input undergoes in order to be reflected as a human output. Each category is roughly defined by different psychological processes such as detecting, identifying, coding, executing a procedure, classifying, and interpreting (Gagné, 1966). The author has indicated that each process would require the design of a different situation for its observation in that there are different types of learning involved.

Therefore, it may be concluded that once the domain of human functions has been clearly defined in terms of learning processes and mapped on to satisfactory taxonomies for describing and categorizing human performance, decisions as to how human beings are to be selected, educated, trained and retrained, as well, decisions as to how standards of performance are to be set, can be made with more certainty. As yet, however, a great deal of work needs to be done in developing classification systems for analyzing tasks in terms of human functions involved in work and determining the types of learning to which they are related.

B. A proposed Theoretical Model

Many different models and schemes have been advanced for classifying human performances in the man-machine system. The model proposed here is concerned primarily with the aspects of human functions that are of theoretical importance for education and training. The model provides a theoretical framework for organizing and structuring human work performance data for the purpose of testing hypotheses, i.e., for predicting (specifying) the education and training requirements for job applicants. The theoretical developments of note that aided in the development of the model were discussed above.

The conceptual system, a two-way classification scheme, provides a broad overview of work performance functions in terms of process and content. Its basic dimensions are "Level of Complexity" and "Training Content." An operational system for the analysis of human work performance data follows.

The conceptual scheme as developed postulates two coordinates for the functional description of an occupation. The first is related to the "Level" of work performances required. This coordinate is categorical in nature and corresponds approximately to the Worker Functions of Comparing, Coding, Compiling, Analyzing, Coordinating, and Synthesizing as suggested by Fine (1955) and based on his work with USES. When these categories are ordered along a continuum, the psychological thread of this scale may be seen as primarily psychological processes (e.g., human intellectual functions) as postulated by Gagné, (see above). The second coordinate is less well defined but is related to the kind of content necessary to perform the job. Considerations such as equipment, tools, instruments, social objects, ideas, and information define this dimension. The psychological thread of this scale may well be conceptionalized in the content category terms of Guilford's Structure of the Intellect; figural, symbolic, semantic, and behavioral. This classification scheme provides a logical clustering of jobs in terms of basic human performance functions and it permits the determination of personal attributes and experience variables required for proficiency and satisfaction in a functional field of work. Its usefulness for determining education and training needs associated with a given pattern of functions has yet to be determined.

C. Analytical Considerations

1. Job Analysis

One major characteristic of FJA is that it is concerned with the functions which comprise a job and not with the aptitudes and basic types of learning involved in work. FJA, therefore, focuses on a later point in the individual's development whereas aptitudes are concerned with the measurement of potential at its earliest identifiable point. The various types of learning intervene between identification of potential and later types of learning intervene between identification of potential and later levels of proficiencies.

If education is defined as changes in performance under specified environmental conditions, then the following steps are necessary to systematically relate job analysis to curriculum research:

Analyze jobs in terms of functions.

b. Analyze functions in terms of the types of learning to which they are related.

c. Analyze curricula in terms of the conditions necessary to establish the various types of learning.

An outline of the model discussed is presented on page A-5.

2. The Grouping Problem in Taxonomic Research and Some Proposed Solutions

A major problem in taxonomic research is the grouping problem-- What are the relevant variables? What are the relevant groups? The author will not attempt to explain the hierarchial structure concept and the probability classification procedures which are part of the analytical techniques employed by the study in defining classes of jobs. The steps, however, are outlined as follows:

a. Start with a model of behavior that will permit the generation of tentative hypotheses concerning the relevant variables and, hence, the relevant groups. Thus, relevant variables are suggested *a priori* by the model of behavior used. In the case of the present study, the classification criteria were based on the theoretical model proposed (A-2), and suggested the important variables in human work functions.

b. The initial conceptionalization of variables and the groups is investigated through the use of the following techniques:

   (1) Hierarchial grouping to find "natural" groups; i.e., clusters of similar jobs.

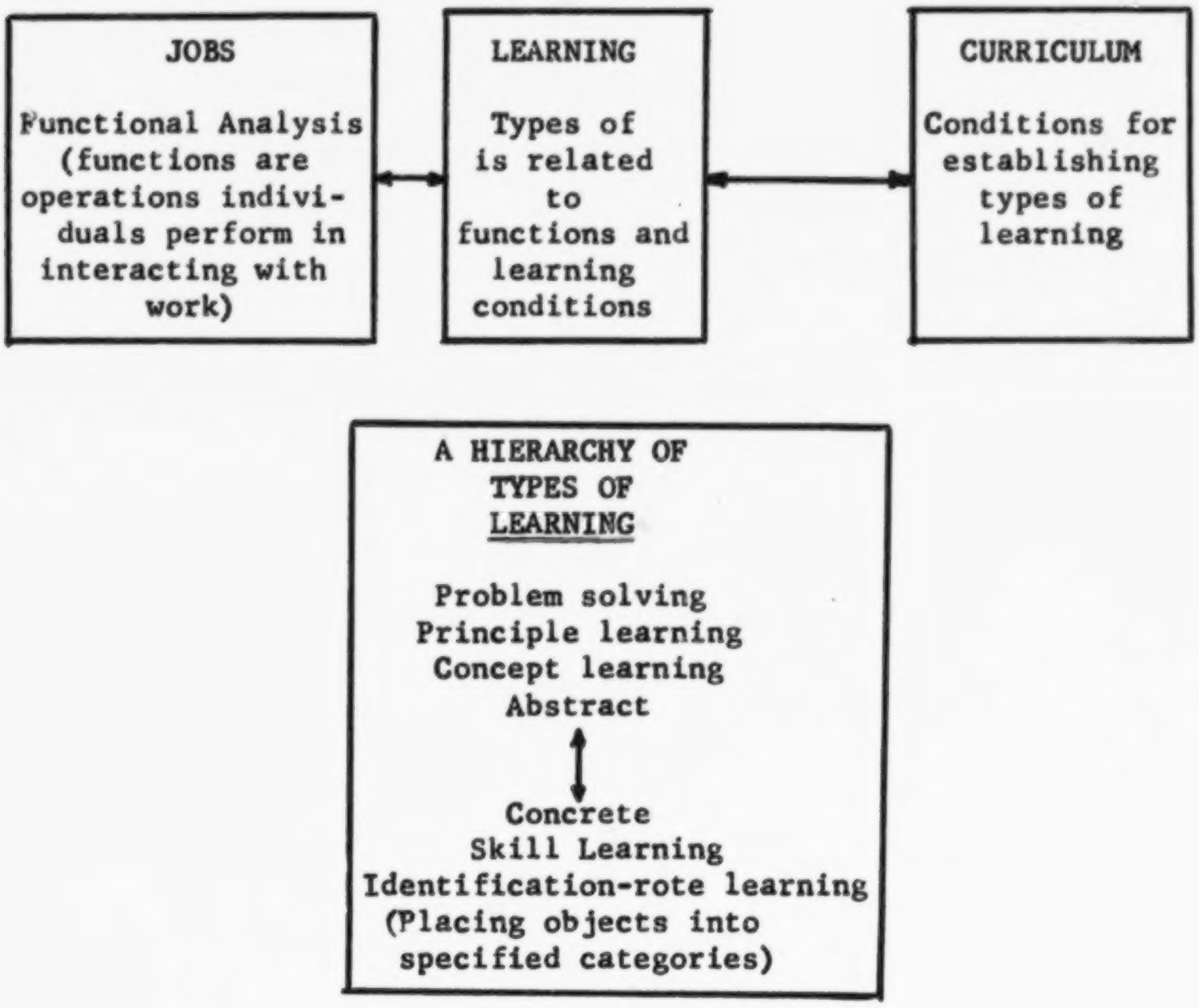
   (2) Scaling of data by inspection and statistical techniques to provide more stable measures of theoretical variables.

   (3) Multivariate analysis to understand the nature of the group differences and to permit further subgrouping.

   (4) A probability classification model to provide probability statements as to occupational group membership for verification of hypotheses as to relevant variables and relevant groups.

c. Revision of the model on the basis of the research findings.

MODEL FOR CURRICULUM RESEARCH



JOBS

Functional Analysis (functions are operations individuals perform in interacting with work)

LEARNING

Types of is related to functions and learning conditions

CURRICULUM

Conditions for establishing types of learning

A HIERARCHY OF TYPES OF LEARNING

Problem solving
Principle learning
Concept learning
Abstract
↕
Concrete
Skill Learning
Identification-rote learning
(Placing objects into specified categories)

INDIVIDUAL APTITUDES

(Physiologically or structurally determined)

Conceptual - Organization & Memorization

Preceptual - Discriminations

Sensory - Acuity

Motor - Automatic

CAPABILITIES

(Training & Experience)

(Skills & Knowledges)

(Present level of proficiency with individuals perform operations)

Appendix B-1

Sampling Procedures

(a) School systems in the region

(b) Colleges and universities in the region

(c) Community media agencies in the region

Appendix B-2

(a) Characteristics of Representative Sample

(b) Description of Prototypic Sample

SAMPLING PROCEDURES

1. Selection of School Systems in the Region

A 20% sample of school systems in the region was selected in the following manner: All school districts located in countries defined as forming a part of the "western Pennsylvania" region, were classified according to high, medium, or low categories of Average Daily Membership (ADM) and Per Pupil Expenditure Less (PE).[1] For ADM, the distribution of data available suggested the following categories: [2]

Low - less than 4,000

Medium - 4,000 - 11,999

High - 12,000 and over

The Pittsburgh city school system was treated as a separate unit. The criterion for high, medium, and low PE was based upon the standard deviation for that distribution as follows:

Low - below mean - 1 = less than $250

Medium - mean ∓ 1 = $250 - $449

High - above mean + 1 = over $449

---

[1] Information which made such a classification possible was supplied by the Department of Public Instruction in Harrisburg. The ADM was calculated from the district teaching fractions applicable to payments due districts in 1964-1965. It does not include the following: Children provided for in Sections 1305 and 1306 of the School Laws, children residing on property under exclusive jurisdiction of Federal government, and children who are residents of states other than Pennsylvania. ADM for jointures was supplied separately by Robert Wilson's office, Department of Public Instruction. PR-less includes the following items from the financial reports (1962-1963) of the districts and jointures: 0100 - Administration; 0200 - Instruction; 0300 - Attendance Services; 0600 - Operation of Plant; 0700 - Maintenance of Plant; 0800 - Fixed Charges; 0900 - Food Services; 1400 - Outgoing Transfers.

[2] The figure of 4,000 students has been suggested as the minimum practical number for carrying out a full curriculum while the figure of 12,000 approaches the minumum figure for a full complement of professional services.

The distribution of school systems among the resulting nine cells is shown below:

N = Gross Number
Sn = Sample Number

PE	Low	Medium	High
Low	N=25 Sn=5	N=0 Sn=0	N=0
Medium	N=287 Sn=56	N=34+1 Sn=7	N=1
High	N=21 Sn=4	N=1 Sn=0	N=0

The medium and high division of ADM were then collapsed giving a six cell matrix. A randomly selected 20% of each cell constitutes the sample for western Pennsylvania. This random sample satisfied the requirement to include counties differing as to availability of Instructional Television (ITV) and Regional Instructional Materials Center (RIMC) service.[1]

Several counties in West Virginia and Ohio were included for the purpose of obtaining information on variations that occur when state boundaries are crossed. School districts in these counties were selected using the above rationale.

The list of school districts was then discussed with University of Pittsburgh faculty familiar with schools in western Pennsylvania. Four additional school systems in Allegheny County were recommended and included as Prototypic because of their media service programs. These are: Mt. Lebanon School District, Baldwin Township School District (including the Oakleaf Elementary experimental school), North Hills Joint School System, and Hickory Township School System. Three of the school districts are in Allegheny County while the fourth is in Mercer County.

An idea of the relative size and per pupil expenditure for the school districts chosen may be obtained from Attachment I.

---

[1] The basic design for sampling was done in consultation with Dr. Donovan Thompson, Professor of Biometry, University of Pittsburgh.

2. Selection of Colleges and Universities in the Region

A stratified cluster sampling of 28 colleges and universities located in the region of study was selected to obtain information needed to help achieve several specific objectives. Junior colleges and university extension campuses were excluded. The sample was stratified according to (a) type of control, state or private; (b) the size of enrollment, small (less than 1,000), medium (1,000-4,999), large (over 5,000); and (c) media services available (instructional television, audiovisual services, language laboratory programs). A 30% sample randomly selected and proportionately distributed among the two types of control, three sizes, and extent of media services resulted in the selection of the following:

				(1962 statistics) Size of Enrollment*		(1964 data)
College	County	Control	Size of Prof. Staff	Full Time	Part Time	Media Services
Thiel	Mercer	Private	70	924	30	AV,LL,ITV
Geneva	Beaver	Private	129	1,040	-	LL
Juniata	Huntingdon	Private	74	816	-	LL
Gannon	Erie	Private	104	1,222	574	AV,LL,ITV
Allegheny	Crawford	Private	98	1,324	49	LL
Clarion	Clarion	State	124	2,133	105	AV,LL,ITV
California	Washington	State	124	2,746	419	AV
Edinboro	Erie	State	100	2,160	75	AV,LL,ITV
Bethany	Brooke, W.Va.	Private	64	736	18	LL

*American Universities and Colleges (9th edition), 1962 statistics, edited by A. M. Cartter.

Of the four universities -Carnegie Institute of Technology, Duquesne University, University of Pittsburgh, and Youngstown University - the University of Pittsburgh and Duquesne were selected because they have organized facilities for serving the educational community in the region.

3. Selection of Additional Media Agencies in the Region

Additional agencies providing specialized services to schools and colleges in the region were then selected. The agencies chosen represent the full complement of organized media services that exist in the region. These agencies include:

Community Media Agencies:

WQED, Educational Community TV Station
Pittsburgh, Pennsylvania 15213

Carnegie Public Library
Pittsburgh, Pennsylvania 15213

Regional Instructional Materials Centers:

Allegheny County Instructional Materials Center
100 Logan Armory, Pittsburgh, Pennsylvania 15213

Beaver County Instructional Materials Center
Court House Annex, Beaver, Pennsylvania

Southwestern Instructional Materials Center
California State College, California, Pennsylvania

B2-1

Characteristics of Representative Sample

SELECTED SCHOOL DISTRICTS
(figures available 1962-63)

PENNSYLVANIA

COUNTY Name of District	Size of Professional Staff	Aver. Daily Membership	Per Pupil Expenditure/Less in Dollars
ALLEGHENY			
Avalon Borough School Dist.	47	1,041	376
Chartiers Valley Joint System	239	5,751	365
Crafton Borough School Dist.	57	1,202	453
East Pittsburgh Borough Schools	28	570	559
Elizabeth Forward Joint System	194	4,651	336
Homestead Borough School Dist.	69	900	717
McKees Rocks Borough School Dist.	73	1,661	341
McKeesport City School Dist.	349	7,384	351
Munhall Borough School Dist.	123	2,433	443
Plum Borough School Dist.	118	2,946	331
Sharpsburg Borough School Dist.	28	602	452
Stowe Township School Dist.	89	2,138	377
Verona Borough School Dist.	31	693	385
ARMSTRONG			
Apollo Area Joint Schools	73	1,736	330
East Brady Area Joint Schools	52	1,204	320
Elderton Joint School System	51	1,187	317
Kittanning Union School Dist.	38	1,668	312
Leechburg Area Joint System	-	1,494	377
N. Buffalo Township School Dist.	14	568	235
Shannock Valley Union School Dist.	50	1,085	343
BEAVER			
Baden-Economy School Dist.	93	2,798	329
Big Beaver Area Joint Schools	27	710	313
Hopewell-Independence-Raccoon Jt.	148	3,891	274
BEDFORD			
Bedford Joint School System	125	2,947	300
Northern Bedford Joint Schools	56	1,303	319
BLAIR			
Frankstown Township School Dist.	9	960	224
Williamsburg Community Joint Schools	46	956	363
BUTLER			
Butler Area Elementary Joint Schools	133	3,214	391
South Butler County Joint Schools	110	2,592	347

COUNTY Name of District	Size of Professional Staff	Aver. Daily Membership	Per Pupil Expenditure/Less in Dollars
CAMBRIA			
Lilly Washington Joint Schools	25	497	349
Nanty Glo-Vintondale Joint	42	1,030	330
Richland Township School Dist.	122	2,666	348
CLARION			
Allegheny Clarion Valley Joint	71	1,522	336
CLEARFIELD			
DuBois Area Joint School System	177	3,810	350
Harmony Joint School System	31	700	326
Philipsburg-Osceola Area Joint	141	3,429	297
CRAWFORD			
Meadville Area Union School Dist.	239	5,212	355
Titusville Area Joint	131	3,012	340
ERIE			
Corry Area Joint School System	119	2,849	343
General McLane Joint System	68	1,480	361
Northwestern Union School Dist.	100	2,224	338
Wattsburg Area Joint System	64	1,505	297
FAYETTE			
Bellmarette Joint System	97	2,380	340
Connellsville City School Dist.	54	2,269	298
Fairchance-Georges Joint Schools	88	2,235	287
Franklin Township School Dist.	16	630	224
Frazier Joint Schools	86	2,107	285
German Township School Dist.	77	1,882	307
North Union Township School Dist.	114	3,318	260
South Union Township School Dist.	87	2,359	286
Uniontown Joint School System	106	2,380	351
FOREST			
West Forest Joint School System	33	678	334
GREENE			
Monongahela Township School Dist.	12	579	288
Southeastern Greene Joint Schools	27	528	379

COUNTY Name of District	Size of Professional Staff	Aver. Daily Membership	Per Pupil Expenditure/Less in Dollars
INDIANA			
Saltsburg Joint School System	49	1,178	312
LAWRENCE			
Laurel School Dist.	--	1,454	330
New Castle Area School Dist.	397	8,182	382
MERCER			
Farrell Area School Dist.	141	3,109	407
Greenville Union School Dist.	102	2,381	353
Pymatuning Joint Schools	38	767	372
Sharon City School Dist.	234	4,949	409
SOMERSET			
Shanksville-Stoneycreek Joint Schools	28	527	387
VENANGO			
Oil City Area Joint System	190	4,183	350
Valley Grove Union Schools	75	1,662	348
WASHINGTON			
Avella Area Joint System	47	1,112	312
Greater Monongahela Area School Dist.	89	2,252	359
McGuffey Joint School System	90	2,080	322
Peters Township School Dist.	102	2,218	375
Union Township School Dist.	24	1,427	246
WESTMORELAND			
Monessen City School Dist.	132	3,087	367
New Kensington City Schools	202	3,867	407
Washington Township School Dist.	51	1,241	319

Pittsburgh City School District	2,879	23,087	402

Recommended School Systems			
ALLEGHENY			
Baldwin Township School Dist.	378	7,988	406
Mt. Lebanon Township School Dist.	364	7,793	461
North Hills Joint School System	267	5,885	410
MERCER			
Hickory Township School Dist.	154	3,302	366

OHIO

COUNTY Name of District	Size of Professional Staff	Aver. Daily Membership	Per Pupil Expenditure/Less in Dollars
COLUMBIANA			
Columbiana (Exempted Village)	56	1,541	300
East Liverpool (City)	222	5,633	312
East Palestine (City)	84	2,056	272
United Local	42	1,332	299
MAHONING			
Jackson-Milton Local	61	1,493	341
Sebring Local	52	1,247	353
Western Reserve Local	29	696	364
TRUMBULL			
Brookfield Local	87	2,247	348
Farmington Local	18	370	313
Fowler-Vienna Local	53	1,260	335

WEST VIRGINIA

BROOKE			
Brooke County	254	5,783	314
HANCOCK			
Hancock County	336	7,953	317
MARSHALL			
Marshall County	295	6,888	298
OHIO			
Ohio County	417	8,844	365

DESCRIPTION OF PROTOTYPIC SAMPLE

State	Type of Organization	Name of Organization	Units Surveyed
Michigan	University	Michigan State University	Broadcasting Colby Lewis, Acting Director
			Communications David Berlo, Head
			Closed Circuit TV Colby Lewis, Coordinator
			Libraries Richard Chapin, Director
			A.V. Center Charles Schuller, Director
			Computation Center Lawrence Von Tersch
Pennsylvania	University	Pennsylvania State University	Instructional Services Leslie Greenhill, Director
			Audiovisual Aids Library Thurston Reeves, Director
Florida	University	Florida Atlantic University	Learning Resources Center Len Singer, Director
			Learning Resources Laboratory Hal F. Riehle, Director
			Libraries Ed. Heileger, Director
			Television and Radio James K. Peterson, Director

State	Type of Organization	Name of Organization	Units Surveyed
California	College	San Jose State College	Division of Audiovisual Services Richard B. Lewis, Director Materials Preparation Center Jerrold Kemp, Coordinator
Illinois	College (Part of a City School System)	Teachers College North	Coordinator of Research and Development Peter D. Abrahms Director of Television Humphrey Stevens, Assoc. Prof. of Ed. Director of Telemation Eldon Ullmer
Missouri	College	Stephens College	Television, Radio & Audiovisual Services Neal Balanoff, Director Libraries Ralph Emerick, Director
California	County Schools Systems	Los Angeles County Schools	
		Alhambra City Schools	Audiovisual Services Charles Betts
		Bellflower Unified	Audiovisual Consultant Neal Matheson
		Beverly Hills	Director of Instructional Materials Daniel Gibson
		Burbank Unified	Director of A.V. Education Don Newcomer
		Norwalk-LaMirada	Audiovisual Services Jack Schirmer, Supervisor
		Pasadena Unified	Coordinator of Learning Materials Allen Fink
		San Gabriel	Audiovisual Coordinator Mary Ruth Hayes
		Torrance Unified	Educational Materials Roderick McDaniel, Supervisor
Illinois	Township School System	Oak Park-River Forest Township	Library Miss Lura Crawford, Librarian Audiovisual Services Joseph Schefter

State	Type of Organization	Name of Organization	Units Surveyed
Massachusetts	County School System	Wayland Senior High School	Audiovisual Director Joseph F. Ryan
New York	County School System	Plainview-Old Bethpage Public Schools	Director of Audiovisual Communications Jack Tanzman
Florida	County School System	Dade County School System	Audiovisual Services Kathryn Carlin, Supervisor
Florida	County School System	Palm Springs Jr. High School	Library Services Betty S. Lunnon, Supervisor Audiovisual Services Gary P. Jacobs
Ohio	County School System	Shaker Heights	Library Florence J. Ritch Audiovisual Services Mr. Shindledecker
California	Board of Education	Los Angeles City Schools	Instructional Aids and Services Branch M. Divizia, Director Supervisor in Charge Radio and T.V. George Lange Supervisor Secondary Audiovisual Dale Eymann Supervisor Secondary Libraries Dorothy Adams Supervisor Audiovisual Section Eugene White
		Los Angeles County Schools	Director of Audiovisual Education R. Gerletti, Director

State	Type of Organization	Name of Organization	Units Surveyed
Illinois	Board of Education	Chicago City Schools	Director of Data Processing Stanley Patton
Kentucky	Public Library	Louisville Public Library	Library Dorothy Day, Librarian
Florida	Public Library	Miami Public Library	Coordinator of Work With Children and Young Adults May Edmonds Community - Public Relations Helga Easton
Illinois	Community TV Station	WTTW	Executive Director John Taylor Television Instruction Herman Chausow, Dean
California	Special Purpose Organization	Systems Development Corp.	Education and Training Staff Charles Silberman, Head
Missouri	Regional Cooperative Audio-Visual Center	St. Louis, Cooperative Center	Paul Andereck, Director

Appendix C

Job Titles of Respondents

Appendix C
JOB TITLES OF RESPONDENTS

	Representative (N)	Prototypic (N)
A-V Coordinator/Librarian	0	3
A-V Coordinator/Teacher	3	0
College Professor	4	1
Director of Instructional Services	1	1
Librarian	68	15
Librarian/A-V Coordinator	6	2
Librarian/Teacher	7	0
Librarian/Teacher/A-V Coordinator	1	0
Principal	25	0
Teacher	39	10
Teacher/A-V Coordinator	34	2
Teacher/Director of Language Labs	1	1
Teacher/Language Lab (Util.)	21	0
Teacher/Librarian	2	1
Team Teacher, Helping Teacher	1	2
T.V. Teacher	4	1
Supervisor in Education	12	7
A-V Coordinator/Guidance	2	0
Director of School Library Services	2	0
Admin. Ass't, Admin. Head	1	2
Television Coordinator	0	3
Principal/A-V Coordinator	5	0
Department Head (College)	2	0
A-V Coordinator, IM Specialist	7	21
A-V Technician, Engineer	2	5
Director of Instructional Materials Center	3	10
Superintendent, Ass't. Super. (Schools)	1	2
Ass't. Director of Instruc. Materials Center	0	2
Research Assistant	2	2
Guidance/Curriculum	1	2
Professor/TV Director (Col.)	0	1
Head, Community Relations Department (Public Library)	0	2
Artist, Graphic Artist, Design Artist	3	8
Cameraman	2	4
Broadcast Technician	6	7
Director (TV)	2	3
Director of Development (TV)	1	0
Director of Operations (TV)	1	7
Director of School Services (TV)	1	1
Ass't. Director of School Services (TV)	1	0
Film Editor	0	2
Floor Manager	1	0
General Manager	1	2
Lighting Director	0	1
Photographer	0	3
Producer	1	4
Producer/Director	1	3
Production Manager	1	0
Stagehand	1	0
TV Production Specialist	1	6
Film Librarian, Tape Librarian	1	3
Ass't. General Manager	1	0

JOB TITLES OF RESPONDENTS (Cont.)

	Representative (N)	Prototypic (N)
Business Manager	1	0
Head, Library Data Processing	0	1
Director of Learning Lab	0	1
Home School Visitor/A-V Coordinator	1	0
Research Associate	1	0
Learning Research Specialists	0	1
Director of Field Testing	1	0
Coder	0	1
Film Inspectors, Film Repairman	2	0
Library Clerk	4	1
Production Trainee	1	0
Secretarial, Clerical	6	4
Language Lab Assistant	2	1
Programmer (Computer)	0	5
Systems Manager	0	1
Computer Operator	0	1
Director of Data Processing	1	3
Systems Analyst	0	2
	302	174

Appendix D

Job Activities Schedule

Form OE-2168C

Budget Bureau No. 51-6406
Expiration Date: 12/31/64

JOB ACTIVITIES SCHEDULE

INSTRUCTIONAL MEDIA PERSONNEL

Return to: Dr. Ann Martin, Project Director
Center for Library and Educational Media Studies
University of Pittsburgh
Pittsburgh, Pennsylvania 15213

JOB ACTIVITIES SCHEDULE

INSTRUCTIONAL MEDIA PERSONNEL

Rapid advances and developments have taken place in the media of instruction (e.g., audiovisual aids, language laboratories, educational television) in the last decade. These changes and developments have necessitated a new understanding of these instructional media and their use in the educational system. In order to meet the training, recruitment, curriculum, and utilization needs which go with these changes, we must have a more adequate systematic assessment of the resources available (both services and personnel) as well as some estimate of the future requirements. It is for this reason that the Office of Education and the Center for Library and Educational Media Studies, University of Pittsburgh, are supporting this survey and asking your cooperation.

The objectives of our program of research are to discover the following: (a) the instructional media personnel functions at all levels, (b) the new developments in equipment, ideas, and organization which influence the way instructional media personnel function, (c) the general and specific training which equips instructional media personnel to function as they do, (d) the future requirements with respect to functions and knowledges, and (e) the relationship of functions and qualifications for the purposes of recruitment, selection, and training.

We recognize that much of the data we seek are of a qualitative nature. On the other hand, a good deal of it is quantitative. We feel that one without the other would yield an incomplete picture. To gather both types of data, we have decided on a Self Report technique which has already demonstrated usefulness with physicists, engineers, bioscientists, and physical therapists. Our preliminary interviews with personnel in instructional media services seem to demonstrate the feasibility of this approach.

Briefly, we seek the following information from those who have been identified as providing instructional media services in or to the schools and colleges with which this study is concerned:

1. Background information
2. Objectives and methods of your work
3. How you deal with people
4. How you deal with information or data
5. How you deal with equipment and tools
6. How you evaluate your work
7. Materials and equipment you work with
8. Services you provide
9. Distribution of time and space
10. Teaching functions
11. Supplementary information concerning skills and training
12. Sources of satisfaction
13. Significant incidents

Admittedly, this is a lengthy survey. However, we hope you will see this as a scientific data-gathering effort which will enable us to estimate resources and define problems in the use and utilization of instructional media. We also trust that this verbalization of your activities and functions will serve as a useful reference base for you in the future. Your time and effort on our behalf are greatly appreciated.

21-4-64-D7

Do not write in this column
(1)____
(2)____
(3)____
(4)____
(5)____
(6)____
(7)____
(8)____
(9)____
(10)____
(11)____
(12)____

I. Background Information

________________ (Name) ________________ (Birth Date) ____________ (Sex)

________________ (Title: Primary position) ________________ (Organization or Employer) ______ (Yrs. pres. position) ____ Full time ____ Part time

________________ (Title: Secondary position) ________________ (Organization or Employer) ______ (Yrs. pres. position) ____ Full time ____ Part time

Present Status	Percent of Time
Teacher (classroom)	
Librarian	
Administrator	
A-V Coordinator	
Instructional Media Specialist	
Engineer	
Technician	
Other (please specify)	
	(Total - 100%)

Areas of Activity - Professional Service	CHECK ALL THAT APPLY. DOUBLE-CHECK THOSE OF MAJOR IMPORTANCE
Acquisition and Evaluation of Materials	
Cataloguing and Classifying of Materials	
Distribution of Materials	
Production of Materials	
Work Concerned with Equipment	
Supervision - Staff	
Inservice Training	
Advisement (other specialists, parents, students, the administration, the public at large)	
Professional Meetings and Related Activities	
Other (specify, e.g., research)	

21-4-64-D7

Do not write in this column

Education

High School, University or Other Institution	Years of Graduation	Degree (if any)	Major	Minor

(13)___

(14)___

Occupational Background (Most recent first; include prior positions held in present organization)

Institution	Location	Title, Rank and/or Position	Years in Position	Nature of Work

Salary

Salary and income information is regarded as confidential and will be used for statistical purposes only. It will NOT be used in any way that will allow it to be identified with you.

My basic annual salary rate as of January 1, 1964 (Primary Position) would fall in one of the following categories: (Please check) (15)___

1) Less than $5,000___ (2) $5-$6,999___ (3) $7-$8,999___ (4) $9-$10,999___

5) $11-$12,999___ (6) Over $13,000___

The amount of my additional income from bonuses, royalties, honoraries, and/or supplementary contracts would fall in one of the following categories: (Please check) (16)___

1) I have none___ (2) Less than $200___ (3) $200-$499___ (4) $500-$999___

5) $1,000-$1,499___ (6) $1,500-$1,999___ (7) Over $2,000___

Professional and Society Memberships (Indicate organization and years affiliated)

_______________ _______________

_______________ _______________

II. Objectives and Methods

a) Please describe overall objective of your institution or organization. For example, the improvement of instruction.

____

____

____

____

b) What are some of your specific objectives in terms of the instructional media service or services you provide? For example: (1) familiarizing the teacher with the instructional media that is available, (2) improving utilization and use of such media.

____

____

____

____

____

c) What specific procedures are you employing in meeting your objectives as stated above? For example, implementing the policies and directives of advisory committee.

____

____

____

____

____

d) What problems are you currently facing in realizing these objectives? For example, how to get maximum utilization with minimum funds, facilities, and staff. (These problems may suggest material for "Significant Incidents" when you come to that section, pages 19 and 20.)

____

____

____

____

____

II. Continued

e) Describe phases of your overall activity on which you have specialized in respect to instructional media services. (This may reflect your specific interest.)

III. In dealing with people, my work typically requires that I: (Check all that apply, then rank major three)

Rank Check

___ ___ 17) Receive and take action on instruction or assignment where procedures are all or mostly specified (e.g., chasing books, putting out theater props).

___ ___ 18) Attend to needs or requests (e.g., charging books from circulation desk, filling requests for films and computer tapes).

___ ___ 19) Obtain information from or give information to others to clarify objectives and procedures (e.g., informal verbal exchange, clarifying work assignment).

___ ___ 20) Use information provided to me to influence others in favor of a product, service, or point of view (e.g., books, films, equipment, auto instruction).

___ ___ 21) Consult with sales representatives concerning equipment or book needs.

___ ___ 22) Communicate knowledge in classroom, laboratory, or meeting to individuals or groups for the purpose of informing them about some subject matter.

___ ___ 23) Provide ideas and suggest solutions to instructional problems within my specialty on the basis of my experience in or knowledge of the field (e.g., serving on advisory boards, cooperating in the planning of programs).

Describe or Give Typical Examples

Please specify who

(CONTINUED ON NEXT PAGE)

III. Continued

Rank Check

___ ___ 24) Interpret plans and objectives to members of my organization; determine procedures and assign duties to carry out plans; evaluate personnel performance (e.g., giving assignments to graphics specialists).

___ ___ 25) Direct course of action for major portion of organization, group, or division on the basis of known information, opinion, or needs (e.g., supervise staff of reference section of library).

___ ___ 26) Formulate policies and program for the total organization and/or relationship to other organizations; interpret plans, objectives and policies to individuals within my organization and other organizations.

___ ___ 27) Other (Please specify).

Describe or Give Typical Examples

Please specify who

IV. My dealing with information or data requires that I: (Check all that apply; then rank major three)

Rank Check

___ ___ 28) Code, enter, or post data or information by hand or machine (e.g., typing catalogue cards, typing lists of audio tapes or telecasts).

___ ___ 29) Check against manuals, models, textbook references, or established instruction to secure, sort, or arrange equipment, information, or individuals (e.g., requisitioning from catalogues, pulling overdue book cards).

___ ___ 30) Suggest changes in routines and standard data processing procedures.

___ ___ 31) Perform established arithmatical or statistical operations on data or information and make summaries of the results (e.g., maintain circulation records).

___ ___ 32) Catalog or classify materials according to established methods.

___ ___ 33) Evaluate materials or data to obtain information which can serve as a basis for recommendations concerning purchase, acceptance or improvement.

___ ___ 34) Analyze and examine instructional situations for media applications (e.g., write programs, select subject matter for lessons, devise visuals).

___ ___ 35) Utilize experience and knowledge to solve problems within my area (e.g., plan layout of school library or classroom, set up classification schemes or indexes).

___ ___ 36) Interpret organizational data to plan work programs within set policy limitations (e.g., assignment of personnel, scheduling events, determining sequence of operations).

(CONTINUED ON NEXT PAGE)

Describe or Give Typical Examples

Please specify source of data

IV. Continued

Describe or Give Typical Examples

Please specify source of data

Rank Check

___ ___ 37) Use information or data developed from surveys and/or investigations to continuously interpret the services being provided by the organization or institution (e.g., prepare instructional film catalogs, set up budgets).

___ ___ 38) Formulate policies and objectives for overall organization in relation to its mission and fundamental needs on the basis of information received.

___ ___ 39) Formulate original research designs to test old or new theories or models.

___ ___ 40) Create new equipment instruments or techniques to meet the needs of my profession (e.g., originate new computer language, invent teaching machine).

___ ___ 41) Formulate theories or data models which restate or reinterpret existing information and ideas or discover new facts and relationships.

___ ___ 42) Other (Please specify).

V. My dealing with tools, equipment, or instruments requires that I: (Check all that apply; then rank major three)

Rank Check

___ ___ 43) Install or construct materials or equipment to meet exacting and complex standards (e.g., installing a computer, creating a diarama, etc.).

___ ___ 44) Repair and adjust equipment to operate properly, altering its function, or restoring malfunctioning equipment for myself or others (e.g., servicing or repairing electronic equipment, projection equipment, etc.).

___ ___ 45) Start, stop and control complex scanning equipment whose operation depends upon response to given signals (e.g., operating a television camera, monitoring equipment, etc.)

___ ___ 46) Start, stop, and control equipment which requires some adjustments in order that it perform properly (e.g., operating IBM data processing equipment, etc.)

___ ___ 47) Make or assemble materials according to specification (e.g., making transparencies, developing films, duplicating realia, etc.)

___ ___ 48) Operate equipment which requires occasional or minor adjustment (e.g., operating a language laboratory console, projector, etc.).

___ ___ 49) Insert or remove materials from equipment or machines which are automatic or previously adjusted (e.g., operating machine that clears films, mimeograph, automatic paper cutting machine, etc.).

___ ___ 50) Handle or use objects or materials for highly specific tasks, often casually where the objects are necessary but not sufficient to accomplish purposes (e.g., stapling papers, dialing phones, writing with chalk or pencil, loading book carts, etc.).

___ ___ 51) Other (Please specify).

Describe or Give Typical Examples

Please specify what tools or equipment

VI. I can evaluate my work from: (Check all those that apply; then rank major three).

If Necessary, Describe or Give Examples

Rank Check

___ ___ 52) Size of budget for the program.

___ ___ 53) Acceptance, renewal or continuation of program; extension or expansion of services.

___ ___ 54) Whether or not materials are accepted for publication or broadcast.

___ ___ 55) Comments from teachers, school board, advisory committee or students.

___ ___ 56) Ability to express or determine results of program with confidence (statistical or judgmental) in relation to effectiveness or ineffectiveness of the program.

___ ___ 57) Check against criteria of state or national standards, (e.g., ALA or NEA).

___ ___ 58) Accredation by professional associations.

___ ___ 59) Check against the tests built into my research design.

___ ___ 60) Check with associates.

___ ___ 61) Approval by supervisor, principal or advisory committee.

___ ___ 62) Check against manuals, models, textbooks or references.

___ ___ 63) Check against job instruction within the organization.

___ ___ 64) Experience or orientation.

(CONTINUED ON NEXT PAGE)

VI. Continued

Rank Check

___ ___ 65) Prior training and experience or outside preparation.

___ ___ 66) Check with results of other teachers, administrators, or committees.

___ ___ 67) Coordination and smooth functioning of procedures.

___ ___ 68) Evaluations of my performance by program administrators.

___ ___ 69) Other (Please specify)

If Necessary, Describe or Give Exampl

II. The materials or services that I use or produce and/or the equipment that I operate in the course of my work would fall roughly in the following classes: (Check all that apply.)

VIII. When I am working in the area checked in VII my activity can best be described as: (Check the appropriate category, then go back and circle the most important cells.)

heck		Operating	Maintaining	Repairing	Installing	Producing or Fabricating	Designing	Testing-evaluation	Storing-classifying	Selection	Distribution	Selling	Editing	Writing	Teaching	Other
___	a) Printed Materials															
___	b) Non-projected Materials (e.g., scenery, charts, maps, etc.)															
___	c) Still Projected Materials (e.g., transparencies, etc.)															
___	d) Motion Pictures															
___	e) Audio Recordings															
___	f) Live Audio Transmission Facilities or Materials															
___	g) Instructional Television Programs															
___	h) Video Tape Recordings															
___	i) Teaching Machines/Programed Instruction															
___	j) Directed Observations (i.e., museums, community resources)															
___	k) Research															
___	l) Articles for Research															
___	m) Computers and/or Computer Systems															
___	o) Other (Please specify)															

IX. Please give us an idea of how you would weight the distribution of your time and attention in the following three areas:

a) Handling, tending, operating, testing, etc., things (tools, equipment, instruments, etc.). . . . . ______% (70)____

b) Analyzing, compiling, coding, developing, etc., data (information, ideas, etc.) . . . . ______% (71)____

c) Dealing, communicating, instructing, consulting, etc., with people . . . . ______% (72)____

100 %

X. In what other areas or ways do you function on your job, not already brought out in your answers to preceding questions?

XI. What part or parts of the work you are now doing do you consider requires the greatest skill?

XII. Do you give instruction or impart knowledge in a classroom situation?

Yes__________ No__________

If not, please skip the question on the next page and go on to page 14.

XIII. My teaching function requires that I: (Check all that apply, rank major three)

Rank Check

___ ___ 73) Supervise and perform standard laboratory demonstrations. Practically everything I need to know is contained in details of assignment.

___ ___ 74) Supervise standard laboratory experiments and perform routine demonstrations. I have some leeway in getting the job done.

___ ___ 75) Modify or devise new laboratory, demonstrations and exercises.

___ ___ 76) Teach in courses whose outlines and subject matter are predetermined, and in which overall objectives and procedures of activity are specified.

___ ___ 77) Teach in courses whose outlines and subject matter are predetermined. However, I have considerable freedom in presenting course material.

___ ___ 78) Give occasional lectures (usually by invitation) on my field or on a specialty within that field.

___ ___ 79) Assume complete responsibility for course content within a specialized area.

___ ___ 80) Conduct seminars and/or direct graduate research.

___ ___ 81) Other (Please specify)

Please specify course titles

XIV. Background Factors:

a) What factors or experiences contributed most to your being in your present position?

____

____

____

____

b) Are there some areas in which you wish you had more knowledge or experience in pursuing your present activities?

1) In order to do a better job

____

____

____

2) In order to equip yourself for your next step in your professional progression

____

____

____

c) What academic preparation would you recommend for those planning to enter your field? Be specific.

____

____

____

____

d) Are there any areas in which you found it necessary or desirable to gain technical skill or knowledge outside of your formal schooling.

____

____

____

XV. Job Satisfaction

Some of the ways that people express their job satisfaction are listed below. Please check your feeling about the importance of each of these items in the appropriate column. Please do not omit any items.

Primary Importance	Secondary Importance	No Importance	
___	___	___	1. Opportunity to apply my education and experience.
___	___	___	2. Fringe benefits (hospital and health plan, pensions, insurance, leave, etc.).
___	___	___	3. Size of annual vacation.
___	___	___	4. Opportunity to obtain personal rights to work (inventions, copyrights, etc.).
___	___	___	5. Status of organization in community.
___	___	___	6. Opportunity for contacts with other specialists.
___	___	___	7. Technical or professional competence of associates.
___	___	___	8. Amount of wage or salary.
___	___	___	9. Level of wage or salary as compared to other positions.
___	___	___	10. Opportunity for advancement to more responsible work.
___	___	___	11. Adequacy of facilities.
___	___	___	12. Location of organization.
___	___	___	13. Opportunity for travel.
___	___	___	14. Status of my profession.
___	___	___	15. Feeling that I'm paid on basis of individual merit.
___	___	___	16. Advisory help when needed.
___	___	___	17. Adequacy of materials and supplies.
___	___	___	18. Payment of tuition and time off for courses (self or family).
___	___	___	19. Relative freedom to develop ideas in which I believe.

(CONTINUED ON NEXT PAGE)

XV. Continued

Primary Importance	Secondary Importance	No Importance	
___	___	___	20. Physical working conditions (modern building, air conditioning, crowding, etc.).
___	___	___	21. Hours of workday – length of workday.
___	___	___	22. Size of my organization.
___	___	___	23. Seniority system.
___	___	___	24. People I get to know in connection with my organization, profession, work.
___	___	___	25. Organizational structure and facilities which give me the opportunity to carry out my ideas.
___	___	___	26. Evaluation of performance.
___	___	___	27. Recognition of years of service.
___	___	___	28. Educational and training opportunities in connection with your job.
___	___	___	29. Amount of time required outside of working hours in connection with your work.
___	___	___	30. Emphasis on high standards of competence.
___	___	___	31. Creative environment.
___	___	___	32. Recognition of achievement.
___	___	___	33. Opportunity to contribute to area's educational needs.
___	___	___	34. Participation in scientific research and experimentation.
___	___	___	35. Working for a non-profit organization.
___	___	___	36. Environment created by the orientation and policies of co-workers.
___	___	___	37. Working with a particular person or group of people.
___	___	___	38. A well run and coordinated organization.
___	___	___	39. Other not covered. Specify____________

Now please go back and circle those items that you believe have the most immediate influence on your continued association with an organization.

PLEASE TEAR THIS SHEET OUT TO USE. BE SURE TO REINSERT IT AFTER COMPLETION.

PLEASE LINE UP THIS SCORE SHEET WITH THE CORRESPONDING NUMBERED ITEMS IN THE SATISFACTION QUESTIONNAIRE. PUT A CHECK IN THE APPROPRIATE COLUMN FOR EACH QUESTION. PLEASE DO NOT OMIT ANY ITEMS.

How well satisfied are you with this condition on your present job?

	Very Satisfied	Satisfied	Not at all Satisfied
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			

fold here

CHECK APPROPRIATE COLUMN.

How well satisfied are you with this condition on your present job?

	Very Satisfied	Satisfied	Not at all Satisfied
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			
31.			
32.			
33.			
34.			
35.			
36.			
37.			
38.			
39.			

XVI. Significant Incidents

A. What they are and why they are being used

Significant incidents are descriptions of effective and ineffective performances by individuals in an occupation. The collection of such descriptions provides the means of supplying important information concerning an occupation or profession from a larger number of individuals than would be possible by the use of observation interviews alone. Their greatest value is in calling to attention certain problems in the work situation which might not be brought to attention through other methods. Significant incidents have been used to develop criteria for personnel selection and to determine the relevance of curriculum content. This is one of the two methods being used by the Center for Library and Educational Media Studies to develop first hand information concerning the instructional media profession.

B. Writing of Incidents

1) Effective Incident

Think back over the last month or two and recall the last time that you remember doing something in the course of your work that you considered to be particularly effective. (Possibly the problems you face which you discussed on page 3 will help call to mind such events.) Just what did you do? Briefly describe in the following manner:

a) What led up to this incident?

b) What was done and why?

c) What was the outcome?

XVI. Continued

B. Writing of Incidents (continued)

2) Ineffective Incident

Think back over the last month or two and recall the last time that you remember doing something in the course of your work that you considered to be particularly ineffective. (Again, the problems you face which you discussed on page 3 may help call to mind such events.) This may not necessarily reflect the general level of your performance. Briefly describe in the following manner:

a) What led up to this incident?

b) What was done and why was it done this way?

c) What was the outcome?

d) What should have been done and why?

Appendix E-1

Transmittal Letters

Appendix E-2

School District and College Characteristics Forms

UNIVERSITY OF PITTSBURGH
Graduate School of Library and Information Sciences
PITTSBURGH, PENNSYLVANIA 15213

CENTER FOR LIBRARY AND EDUCATIONAL
MEDIA STUDIES

[LETTER TO
ASSISTANT COUNTY
SUPERINTENDENTS IN WESTERN PENNSYLVANIA]

The Center for Library and Educational Media Studies at the University of Pittsburgh is conducting a study of Instructional Media Resources and Personnel under the sponsorship of the U.S. Office of Education. The study is directed toward determining the new positions which are being created by instructional media programs and services to schools and colleges. Its primary objective is the assessment of new professional and technical job activities which should be taken into account by graduate schools of education and library science in the professional preparation of students. Our study deals primarily with colleges and school systems in 33 counties in western Pennsylvania and contiguous counties in Ohio (Trumbull, Mahoning, and Columbiana) and West Virginia (Hancock, Brooke, Ohio, and Marshall). In addition, a comparison group of schools, colleges, and media agencies outside of this region has been selected.

Within the sample region, a 20% sample of school districts has been chosen. In your county, this sample includes:

We would like permission to obtain information from those individuals in the above schools who are responsible for the media services with which we are concerned. These include library services, audiovisual services, utilization of educational television, programing for language laboratories, experimental or classroom use of programed instruction, and educational data processing.

We seek your advice as to the best procedure. Should we contact the supervising principals, someone from your own office, or is there some better way to make arrangements? In either case, we will need the names and addresses of those administrators in the school districts listed whom we should contact. As we have only a short period of time to gather all of our data, Miss McAtee, our Survey Co-ordinator, will contact you direct sometime within the next two weeks.

We are enclosing a general outline of the purpose and scope of our study for your information and reference.

Thank you in advance for your time, effort, and attention in this matter. We will await advice and suggestions from your office before we proceed.

Sincerely yours,

Ann M Martin

Ann M. Martin, Ph.D.
Research Director

Enclosure

UNIVERSITY OF PITTSBURGH
Graduate School of Library and Information Sciences
PITTSBURGH, PENNSYLVANIA 15213

CENTER FOR LIBRARY AND EDUCATIONAL
MEDIA STUDIES

[LETTER TO
SCHOOL SUPERINTENDENTS
IN OHIO COUNTIES]

The Center for Library and Educational Media Studies at the University of Pittsburgh is conducting a study of Instructional Media Resources and Personnel under the sponsorship of the U.S. Office of Education. The study is directed toward determining the new positions which are being created by instructional media programs and services to schools and colleges. Its primary objective is the assessment of new professional and technical job activities which should be taken into account by graduate schools of education and library science in the professional preparation of students. Our study deals primarily with colleges and school systems in 33 counties in western Pennsylvania and contiguous counties in Ohio (Trumbull, Mahoning, and Columbiana) and West Virginia (Hancock, Brooke, Ohio, and Marshall). In addition, a comparison group of schools, colleges, and media agencies outside of this region has been selected.

Within the western Pennsylvania region, a 20% sample of school districts has been chosen. In your county, this sample includes:

We would like permission to obtain information from those individuals in the above schools who are responsible for the media services with which we are concerned. These include library services, audiovisual services, utilization of educational television, programing for language laboratories, experimental or classroom use of programed instruction, and educational data processing.

We seek your advice as to the best procedure. Should we contact the supervising principals, someone from your own office, or is there some better way to make arrangements? In either case, we will need the names and addresses of those administrators in the school districts listed whom we should contact. As we have only a short period of time to gather all of our data, Miss McAtee, our Survey Co-ordinator, will contact you direct sometime within the next two weeks.

We are enclosing a general outline of the purpose and scope of our study for your information and reference.

Thank you in advance for your time, effort, and attention in this matter. We will await advice and suggestions from your office before we proceed.

Sincerely yours,

Ann M Martin

Ann M. Martin, Ph.D.
Research Director

Enclosure

UNIVERSITY OF PITTSBURGH
Graduate School of Library and Information Sciences
PITTSBURGH, PENNSYLVANIA 15213

CENTER FOR LIBRARY AND EDUCATIONAL
MEDIA STUDIES

[LETTER TO
DIRECTORS OF
REGIONAL INSTRUCTIONAL MEDIA CENTERS]

Some months ago we wrote you concerning our regional study of instructional resources and at that time you sent us some very helpful information on the organization of your Center. We are now conducting a series of interviews to obtain original data from personnel in the media field.

In this respect, we again seek your help in suggesting to us those schools that would be to our best advantage to visit. With your background and knowledge of the area, can you recommend approximately three high schools and three elementary schools that make good use of the services of the Appalachian Instructional Materials Center and that you feel should be included in our survey. Would you also note the personnel whom we should contact in these schools.

Since we are running late in the school year, we would appreciate this information as soon as possible. Thank you again for your time, effort, and cooperation in this project.

Sincerely yours,

Ann M. Martin, Ph.D.
Research Director

E1-6

UNIVERSITY OF PITTSBURGH
Graduate School of Library and Information Sciences
PITTSBURGH, PENNSYLVANIA 15213

CENTER FOR LIBRARY AND EDUCATIONAL
MEDIA STUDIES

I would like to express my thanks to you for the cooperation you have given to us in our collection of data for the Regional Study of Instructional Media Resources and Personnel. The time and effort spent in behalf of our study are greatly appreciated.

We will be completing our collection of data before the Christmas Holidays. A report will then be compiled for the U.S. Office of Education, a copy of which will be made available shortly thereafter to you and your colleagues.

Again our sincere thanks for your invaluable assistance. It is through the interest of individuals such as yourself that our project will be a success.

Sincerely yours,

E2-1

SCHOOL DISTRICT CHARACTERISTICS

1. School District: Phone:

No Elem.______ No. Jr. High ______ No. Sr. High ______ No.Combined____

2. County

3. City or Town:

4. Superintendent
or Supervising Principal:

5. Contact for the following:__________________ Phone: __________________
(Name) (Title)

ADM: Year ________

PR-less: Year ________
(Include the following items only: 0100 - Administration; 0200 - Instruction; 0300 - Attendance Services; 0600 - Operation of Plant; 0700 - Maintenance of Plant; 0800 - Fixed Charges; 0900 - Food Services; 1400 - Outgoing Transfers.)

A-V Expenditure: (line item 0224 on financial report)

Library Expenditure:

6. a. ITV:

1) Number of television sets per building ______ Elem. ______ Sec.

2) Do you support ITV? ______ Yes ______ No

3) What station(s)? ____________________________

4) How used:

Grade	Subject	Grade	Subject

5) Do you find it satisfactory? ____ Yes ____ No ______________ Comments

____
Comments

6) Do you have closed circuit ITV in your school system? ______ Yes ______ No

____
Comments

b. Do you support a RIMC? ______ Yes ______ No Name ______________

7. Library Facilities:

	Elem.			Sec.			
a. Centralized library collection (library room)	___ Yes	___ No	___ #	___ Yes	___ No	___ #	___ Combined Services

	Elem.		Sec.	
b. Classroom collections	___ Yes	___ No	___ Yes	___ No
c. Serves as public library	___ Yes	___ No		
d. Is there a public library near?	___ Yes	___ No		
e. Do you use student assistants?	___ Yes	___ No	___ Comments	

8. A-V Facilities:

a. Is the equipment centralized in a room?	___ Yes	___ No
b. Are there elementary facilities?	___ Yes	___ No
c. Are there secondary facilities?	___ Yes	___ No

d. Do you keep equipment ___
materials ___
card catalog ___ in the library?

e. Do you have production facilities for making materials?	___ Yes	___ No
Centralized?	___ Yes	___ No

f. What type production equipment? ___

9. **Language Labs:** How many language laboratories are in your school district?_____ (Note: If more than one, use extra columns below to separate information.)

	1	2	3
a. Number of student positions with head sets only	___	___	___
b. Number of positions with head set and microphone only	___	___	___
c. Number of student positions with microphone, headset, and tape or disc recorder?	___	___	___
d. Number of individual booths?	___	___	___
e. Master console? (Yes or No)	___	___	___
f. Number of simultaneous programs possible (including teacher's voice) with present equipment?	___	___	___
g. Date (month and year) laboratory was placed in operation?	___	___	___
h. Is this laboratory considered basically permanent (indicate with "PR"), or portable (indicate with "PO")?	___	___	___

i. Is the language laboratory used as an instructional device in any subjects other than MFL? Yes____ No____

If "Yes" explain briefly____

____

10. **P.I.:**

a. Use

	Grades	Subject	Publisher
Yes________	________	________	________
No________	________	________	________
	________	________	________
	________	________	________

b. How used?

________	____	________	________	________	____
supplement	basic	enrichment	homebound	remedial	other

COLLEGE AND UNIVERSITY CHARACTERISTICS

Name of College:

County:

Mailing Address: ____
Street State Zone

Current Enrollment: Full-time ________ Part-time ________

Size of Professional Staff: Full-time ________ Part-time ________

Instructional Television: Budget for academic year: ________

a. Do you use open circuit instructional television? ___ No ___ Yes ________ Station(s)

b. Name, title, and academic department of director of program:

____

c. How used:

Level & Subjects	Level & Subjects	Level & Subjects

d. Do you have closed-circuit television? ___ Yes ___ No Budget for academic year ________

e. Name, title, and academic department of director of program:

____

f.

Level & Subjects	Level & Subjects	Level & Subjects

g. What is source of programing; i.e. sources of film, kinescope or live programing?

____

____

____

(Please include copy of broadcast schedule, if possible)

5. Library Facilities: Budget for academic year:__________

a. Staff:

Name, title, and academic department of director:______________________________

____

Professional	Semi-Professional	Student Help
Full time__ __________ Part time__	Full time__ __________ Part time__	Full time__ __________ Part time__
Full time__ __________ Part time__	Full time__ __________ Part time__	Full time__ __________ Part time__
Full time__ __________ Part time__	Full time__ __________ Part time__	Full time__ __________ Part time__
Full time__ __________ Part time__	Full time__ __________ Part time__	Full time__ __________ Part time__

b. Describe extent of non-print holdings:______________________________

____

____

6. Audiovisual Facilities: Budget for academic year:______________

Name, title, and academic department of director of program:________________

____

a. Are the equipment and materials centralized? _____ Yes _____ No

Where____

____

6. Audiovisual Facilities (continued)

b. Does the library serve as an instructional materials center? ____ Yes ____ No

To what extent? ____

____

c. Do you have production facilities for making materials? ____ Yes ____ No

Describe type of production: ____

____

d. Do you obtain films from National ______ or Regional ______ film libraries?

Neither ________. Other sources: ____

e. Name or names of film libraries used: ____

____

7. Language Labs: How many language laboratories are in your school district? ________
(Note: If more than one, use extra columns below to separate information.)

Budget for academic year: ____________

Name, title, and academic department of director of program: ________________________

____

	1	2	3
a. Number of student positions with head sets only	___	___	___
b. Number of positions with head set and microphone only	___	___	___
c. Number of student positions with microphone, headset, and tape or disc recorder?	___	___	___
d. Number of individual booths?	___	___	___
e. Master console (Yes or No)	___	___	___
f. Number of simultaneous programs possible (including teacher's voice) with present equipment	___	___	___

7. Language Labs (continued)

		1	2	3
g.	Date (month and year) laboratory was placed in operation	___	___	___
h.	Is this laboratory considered basically permanent (indicate with "PR"), or portable (indicate with "PO")?	___	___	___

i. Languages taught using the lab:______________________________

____

j. Other languages taught______________________________

k. Is the language laboratory used as an instructional device in any subjects other than MFL? Yes______ No______

If "Yes" explain briefly______________________________

____

8. Programed Instruction:

a. Use	Level & Subject	Publisher
Yes_____	______________	______________
No_____	______________	______________
Budget for academic year:__________	______________	______________
	______________	______________

b. How used? ______ supplement ______ basic ______ enrichment ______ homebound ______ remedial ______ other

____
(comment)

9. Educational Radio: _____ Yes _____ No Budget for academic year:__________

Name, title, and academic department of director of program:______________________________

____

a. Does the school have its own station?_______ Call letters:__________

9. Educational Radio (continued)

   b. How is it staffed?____

   c. Do you use any other educational or commercial stations?______ Call letters_____

   d. What type of programing do you originate or use? (Include copy of broadcast schedules)____
   (comment)

   ____

Appendix F

Job Titles Identified With Fourteen Derived Occupational Groups

Appendix F
JOB TITLES IDENTIFIED WITH FOURTEEN DERIVED OCCUPATIONAL GROUPS

GROUP 1 Administrator

JOB TITLE

Manager, Closed Circuit TV
Supervisor
Director of the Library
Director of Audiovisual Services
Administrative Assistant
Director of Data Processing
Assistant Superintendent
Director of Field Testing
Business Manager (ETV)
Director of School Services (ITV)
Assistant General Manager (ETV)
Director of Programming (ETV)
Executive Director (ETV)
Head, School Department (Library)
Director of Division of Instructional Services
Director of AV Education and ETV
Director of Instructional Services
Director of Communications

GROUP 2 Supervisor

Supervisor, Secondary School Librarian
Curriculum Supervisor
Elementary Principal
Manager of Systems
Director of Instructional Material
Principal
Assistant High School Principal
Supervisor, Elementary Library
Assistant Principal
Supervisor, AV Services
Elementary Supervisor
Computer Supervisor
Modern Language Department Chairman
Elementary AV Supervisor
Supervisor Radio-TV
Assistant Director of Data Processing
Coordinator, TV Services
Library Coordinator
Educational Materials Administrator
Supervisory Principal
Guidance and Curriculum Coordinator
Director of AV Education
Director of Elementary Education
Elementary Supervisor
ITV Coordinator

Appendix F
JOB TITLES IDENTIFIED WITH FOURTEEN DERIVED OCCUPATIONAL GROUPS (Cont)

GROUP 2 Supervisor (Cont)

JOB TITLE

Curriculum Assistant
TV Teacher
Teacher
Supervising Principal
Supervisor of Instruction
Director Sec. Education
Elementary Visual Education Coordinator
Head of Information Retrieval
Coordinator of Learning Materials
Head of Library Data Processing
Head Liaison Service
AV Aids Director
Coordinator of Instructional School Services (ETV)
Supervisor, Still Photography
Assistant Director, School Services (ETV)
Supervisor, Instructional Graphics
Supervisor, Music and Traffic Coordinator
TV Transmitter Supervisor
AV and Library Coordinator

GROUP 3 College or University Teacher

Assistant Professor of Education
Associate Professor and Director of ETV
Art Director

GROUP 4 Research Specialist

Coordinator of Research Development
Instructor, Communications
AV Specialist
Social Scientist
Systems Analyst II
Research Associate
Learning Research Specialist
Head, Information Retrieval Research

GROUP 5 Media Production Specialist (TV)

Director of Instruction
Producer
Producer-Director
TV Director-Producer
Director
Assistant Director

Appendix F
JOB TITLES IDENTIFIED WITH FOURTEEN DERIVED OCCUPATIONAL GROUPS (Cont)

GROUP 5 Media Production Specialist (TV) (Cont)

JOB TITLE

Technical Director
Supervisor, AV Services
Film Editor
Music Librarian (ETV)
Production Manager
Director of Radio & TV
Area Coordinator, TV Production

GROUP 6 Media Production Specialist (AV)

JOB TITLE

Photographer
Graphic Artist
Artist
Scenic Designer
AV Production Specialist
Visual Communications Specialist

GROUP 7 Instructional Media Specialist

AV Coordinator
Director, IMC
AV Consultant
AV Coordinator
Coordinator, AV Utilization Services
Library Coordinator
Library and AV Coordinator
Coordinator of Material Preparation Services
Head, Film Production
Assistant Director AV Department, IMC
AV Director (Schools)
Head Librarian
Tape Librarian
Assistant Director AV Education (IMC)
AV Specialist
Director of Telemation
AV Aids Instructor
Head of Community Relations
AV Director and Consultant
Director of AV Education
Director of AV Activities
Supervisor, Instructional Materials Center
District Coordinator for Languages
Program Coordinator
AV Director and Librarian
Director, Instructional Materials Center

Appendix F
JOB TITLES IDENTIFIED WITH FOURTEEN DERIVED OCCUPATIONAL GROUPS (Cont)

GROUP 8 Librarian

JOB TITLE

Librarian
Cataloger
Film Librarian
Elementary Librarian
Head Librarian
Teacher-Librarian
Circulation Librarian
Jr. High Librarian
High School Librarian
Librarian-AV Coordinator
Reference Librarian
Coordinator of Work with Children
Library Assistant

GROUP 9 Computer Specialist

Computer Operator
Senior Computer Operator
Programmer II
Computer Programmer

GROUP 10 Engineer (AV, TV)

Engineer in Educational TV
Engineering Supervisor
Transmitter Engineer
Coordinator of Technical Service
Technical Assistant
Shop Manager
Videotape Supervisor
Chief Engineer
Sound Engineer
TV Cameraman
Senior TV Engineer
Equipment Manager
Technician
Electrical Technician
TV Cameraman
Lighting Director
Engineer, Crew Chief

GROUP 11 Television Teacher

TV Consultant
TV Teacher

Appendix F
JOB TITLES IDENTIFIED WITH
FOURTEEN DERIVED OCCUPATIONAL GROUPS (Cont)

GROUP 12 Teacher

JOB TITLE

Teacher
Elementary Teacher
High School Teacher
Teacher, Science
Teacher, Math
Teacher, Math, Physics
Teacher, Spanish
Principal
Helping Teacher
Teacher, Librarian
Teacher, English
Language Laboratory Director
Assistant Professor of Modern Language
Professor of Philosophy and Religion

GROUP 13 Teacher-AV Coordinator

Guidance Director
Teacher-Visual Aids Director
Assistant Professor-Language Laboratory Director
Teacher-AV Director
Teacher-AV Coordinator
Chairman Foreign Language Department
Industrial Arts Instructor
Teacher-Audiovisual Director
Biology Teacher-AV Director
Teacher
Teacher-AV Aid
Teacher-Visual Aids Coordinator
Assistant Professor, French and Spanish-Language Laboratory Director

GROUP 14 Clerical or Technical Assistant

Data Control Coder
Language Laboratory Attendant
Language Laboratory Director
Office Manager
Senior Clerk
Equipment Technician, Senior Projectionist
Laboratory Technician
Supervisor-Scheduler
Clerk
Film Repairman, Storekeeper
Film Inspector

Appendix G-1

Items Defining the FJA Scales

Appendix G-2

Definitions of FJA Categories

Appendix G-1
JOB ACTIVITIES SCHEDULE ITEMS DEFINING THE FJA SCALES

CARD 1

A. Biographical Information

Variables	Description		Card Columns
1	Age		14
2	Sex		15
3	Educational Status		19

B. Functional Job Analysis Data - Level of Complexity

Variables	Description		Card Columns
	People Functions		
4	Serving - Helping	Items 17,18,19	23 & 25
5	Persuading	Items 20,21	26
6	Instructing	Items 22 & Do you teach	28 & 79
7	Supervising	Items 23,24,25	29 & 30
8	Negotiating	Item 26	32
	Clerical		
9	Coding - Compiling - Computing	Items 28,29,31	34 & 37
10	Classifying	Items 32,33	38
11	Analyzing	Item 34	40
12	Interpreting-Coordinating	Items 30,35,36	36 & 41
13	Interpreting-Policy Making	Items 37,38	43
14	Interpreting-Creating	Items 39,40,41	45

CARD 1

B. Functional Job Analysis Data - Level of Complexity (Cont.)

Variables	Equipment, Material Functions		Card Columns
15	Precision Working-Setting Up	Items 43,44	49
16	Operating-Controlling	Items 45,46	51 & 52
17	Manipulating	Item 47	53
18	Feeding-Tending	Items 48,49	54 & 55
19	Handling	Item 50	56
	Distribution of Time		
20	People		76
21	Data		77
22	Things		78

C. Functional Job Analysis Data - Orientation of Job

CARD 2
(underlined numbers are Card 3)

	Work Area (a) Printed Materials (b) Non-projected Materials	
23	Production	25,26,31
24	Distribution	24,27,28,29,30
25	Utilization	23 & 32
	Work Area (c) Still Projected Materials (d) Motion Pictures (e) Audio Recording	
26	Production	35,36,41,45, 51,55,61
27	Distribution	34,37,38,39,40, 44,47,48,49,50, 54,57,58,59,60
28	Utilization	33,42,43,52,53,62
	Work Area (f) Live Audio Transmission (g) Instructional Television (h) Live Audio Transmission	
29	Production	65,25,26,31

CARD 2
(underlined numbers are
Card 3)

C. Functional Job Analysis Data - Orientation of Job (Cont.)

Variables	Work Area	Card Columns
30	Distribution	63,67,68,69,70, 24,30
31	Utilization	23,27
		CARD 3
	Work Area (Programmed Instruction)	
32	Development	35
33	Utilization	33
	Work Area (Directed Observations)	
34	Utilization	43,47
	Work Area (Research)	
35	Conduction	55
36	Distribution	58
	Data Processing Equipment	
37	Operation	63,65,68

APPENDIX G-2

TABLE 1

STRUCTURE OF FUNCTIONS

Things	Data	People
Precision Working	Synthesizing	Negotiating
Setting Up	Inventing	Supervising
Manipulating	Coordinating	Consulting, Instructing, Treating
Operating-Controlling	Analyzing	Persuading, Diverting
Driving-Controlling	Compiling	Exchanging Information
Tending	Computing	Serving
Feeding	Comparing	Taking Instructions-Helping
Handling	Copying	Learning
Learning	Learning	Observing
Observing	Observing	

DEFINITIONS OF WORKER FUNCTIONS

Things

Precision Working:
Using body members and/or tools, or equipment to work move, guide, or place objects or materials in situations where ultimate responsibility for attaining precision occurs and selection of appropriate tools, objects, or material, and the adjustment of the tool to the task, require exercise of considerable judgment.

Data

Synthesizing:
Integrating analyses of data to discover facts and/or develop knowledge concepts or interpretations.

Inventing:
Inventing new devices, creating original works of art, and formulating original designs.

People

Negotiating:
Exchanging ideas, information and opinions with others (including animals) through explanation, demonstration, and supervised practice.

Supervising:
Determining or interpreting work procedure for a group of workers, assigning specific duties to them, maintaining harmonious relations among them, and promoting efficiency.

Things

Setting Up:
Adjusting machines or equipment by replacing or altering tools, jigs, fixtures, attachments, etc. to prepare them to perform their functions, change their performance or restore their proper functioning if they break down. Workers who set up one or a number of machines for other workers or who set up and personally operate a variety of machines are included here.

Manipulating:
Using body members, tools, or special devices to work, move, guide, or place objects or materials, and involving some latitude for judgment with regard to precision attained and selecting appropriate tool, object, or material although this is readily manifest.

Operating-Controlling:
Starting, stopping, manipulating the controls and adjusting the progress of machines or equipment designed to fabricate and/or process things, data, or people. Operating machines involves setting up the machine and adjustment of the machine or material as the work progresses. Controlling equipment involves observing guages, dials, etc. and manipulating valves and other devices to control such items as temperature, pressure, flow of liquids, speed of pumps, and reactions of materials.

Data

Coordinating:
Determining time, place, and sequence of operations, or action to be taken on basis of analysis of data; executing determinations and/or reporting on events.

Analyzing:
Examining and evaluating data. Presenting alternative actions in relation to evaluation is frequently involved.

Compiling:
Gathering, collating, or classifying information about Things, Data, or People. Reporting and/or carrying out a prescribed action in relation to the information are frequently involved.

Computing:
Performing arithmetic operations and reporting on and/or carrying out a prescribed action in relation to them. Does not include counting.

Comparing:
Judging the readily observable functional, structural, or compositional characteristics (whether similar to or divergent from obvious standards) of Things, Data, or People.

Coding:
Transcribing, entering, or posting data.

People

Consulting:
Serving as a source of technical information and giving such information or providing ideas to define, clarify, enlarge upon, or sharpen product specifications, procedures, or capabilities. Examples are: craftsmen consulting with designers concerning machine or craft capability; working out specifications with a manufacturer's representative; preparing computer programs with sponsors; editing manuscripts for publication with authors; advising on policy strategy with negotiators.

Instructing:
Teaching subject matter to others, or training others (including animals) through explanation, demonstration, and supervised practice.

Treating:
Acting or interacting with individuals or small groups of people (or animals) who need help (as in sickness), carrying out specialized therapeutic or adjustment procedures. These procedures usually have been or are subject to empirical or scientific test and require systematic observation of results within the framework of total person behavior because of unique individual reactions to them. Treating frequently requires motivating, supporting, and instructing individuals to accept or cooperate with therapeutic or adjustment procedures.

Things

Driving-Controlling:
Starting, stopping, and manipulating the controls of machines for which a course must be steered or guided in order to fabricate, process, and/or move things or people. Excludes such manually powered machines as hand trucks and dollies.

Tending:
Starting, stopping, and observing the functioning of machines and equipment. Tending may involve handling of controls of the machines or material as the work progresses, but does not involve setting up the machine.

Feeding:
Inserting materials in or removing them from machines or equipment which are automatic or tended or operated by other workers.

Handling:
Using body members, hand tools, and/or special devices to work, move, or carry objects or materials and involving little or no latitude for judgment with regard to precisions attained or in selecting appropriate tool, object, or material.

Learning:
Observing and studying to acquire knowledge and skill. Applies to apprentices, helpers who are informal apprentices, and students.

Observing:
Applying selective attention to the work environment, or part of it, as perceived through any of senses.

Data

Learning:
Observing and studying to acquire knowledge and skill. Applies to apprentices, helpers who are informal apprentices, and students.

Observing:
Applying selective attention to the work environment, or part of it, as perceived through any of the senses.

People

Persuading:
Influencing others in favor of a product, service, or point of view.

Diverting:
Amusing others.

Exchanging Information:
Talking, conversing with, and/or signaling people to convey or obtain information within the framework of well-established procedures, or to clarify what is wanted in an assignment. Conveying or obtaining information to or from supervisor or colleague, are examples.

Taking Instructions-Helping:
Attending to the work assignment instructions or orders of supervisors. (No immediate response required unless clarification of instruction or order needed). Helping applies to "non-learning" helpers.

Learning:
Observing and studying to acquire knowledge and skill. Applies to apprentices, helpers who are informal apprentices, and students.

Observing:
Applying selective attention to the work environment or part of it as perceived through any of the senses.

NOTE: Observing and Learning are a necessary base for all other functions; however, they are not to be assigned as rating. Learners of various types (helpers, aids, apprentices, etc.) are to be assigned the functions of the job which they are learning. The title typically reflects the "learning" status of the job.

Appendix H

FJA DISCRIMINANT ANALYSIS PLOTS

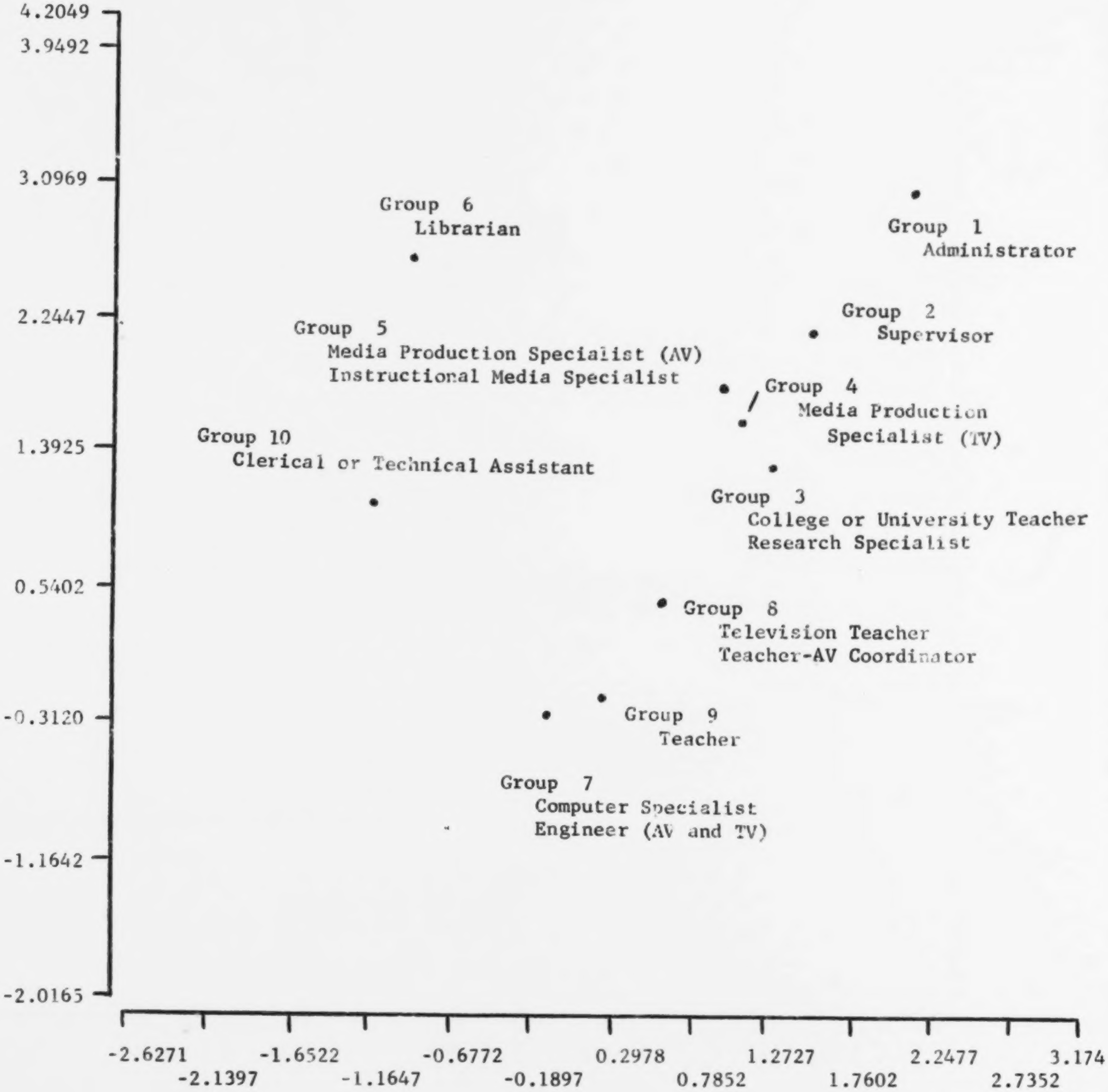


FIGURE 1. FJA DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 2.

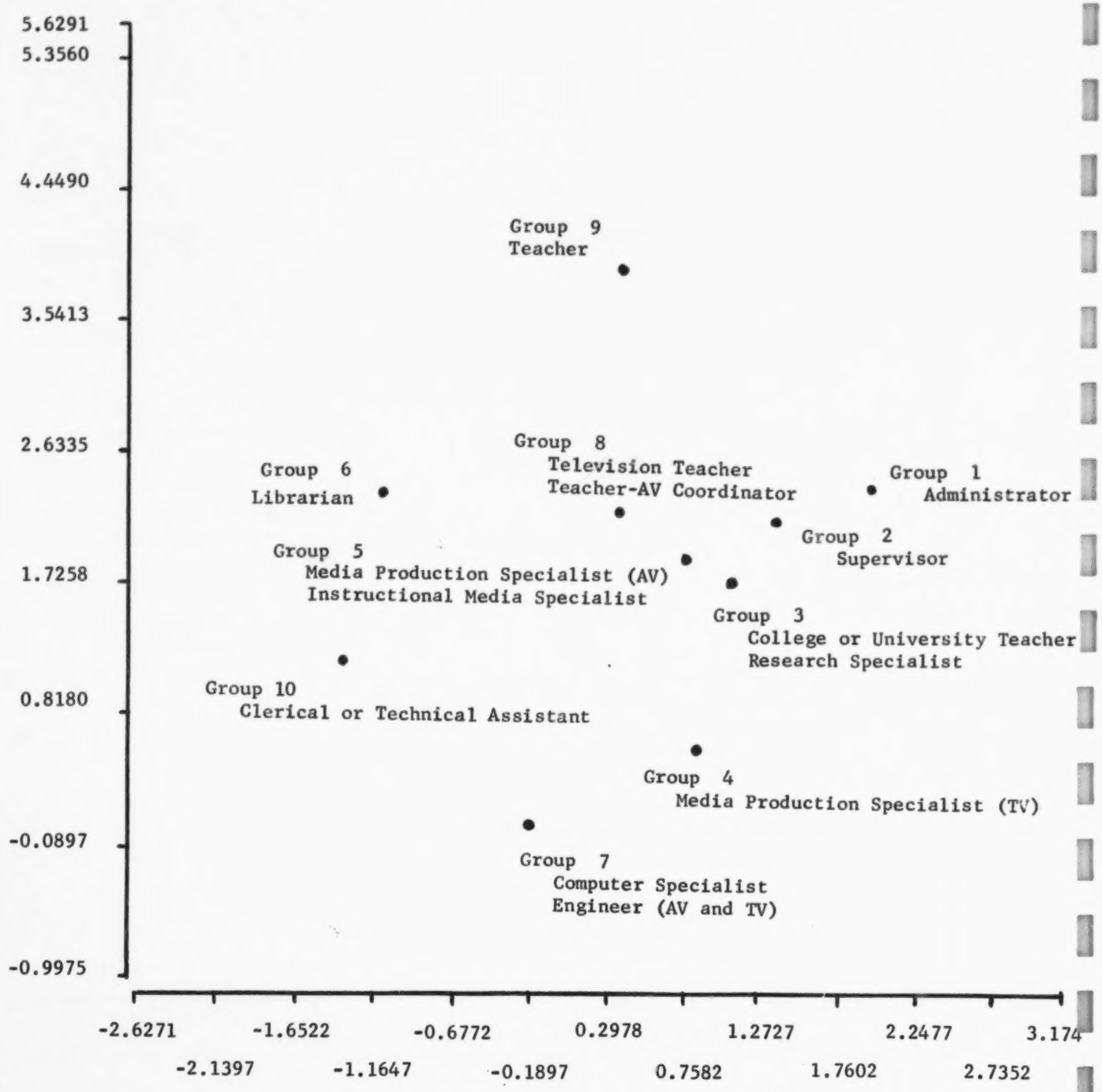


FIGURE 2. FJA DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 3

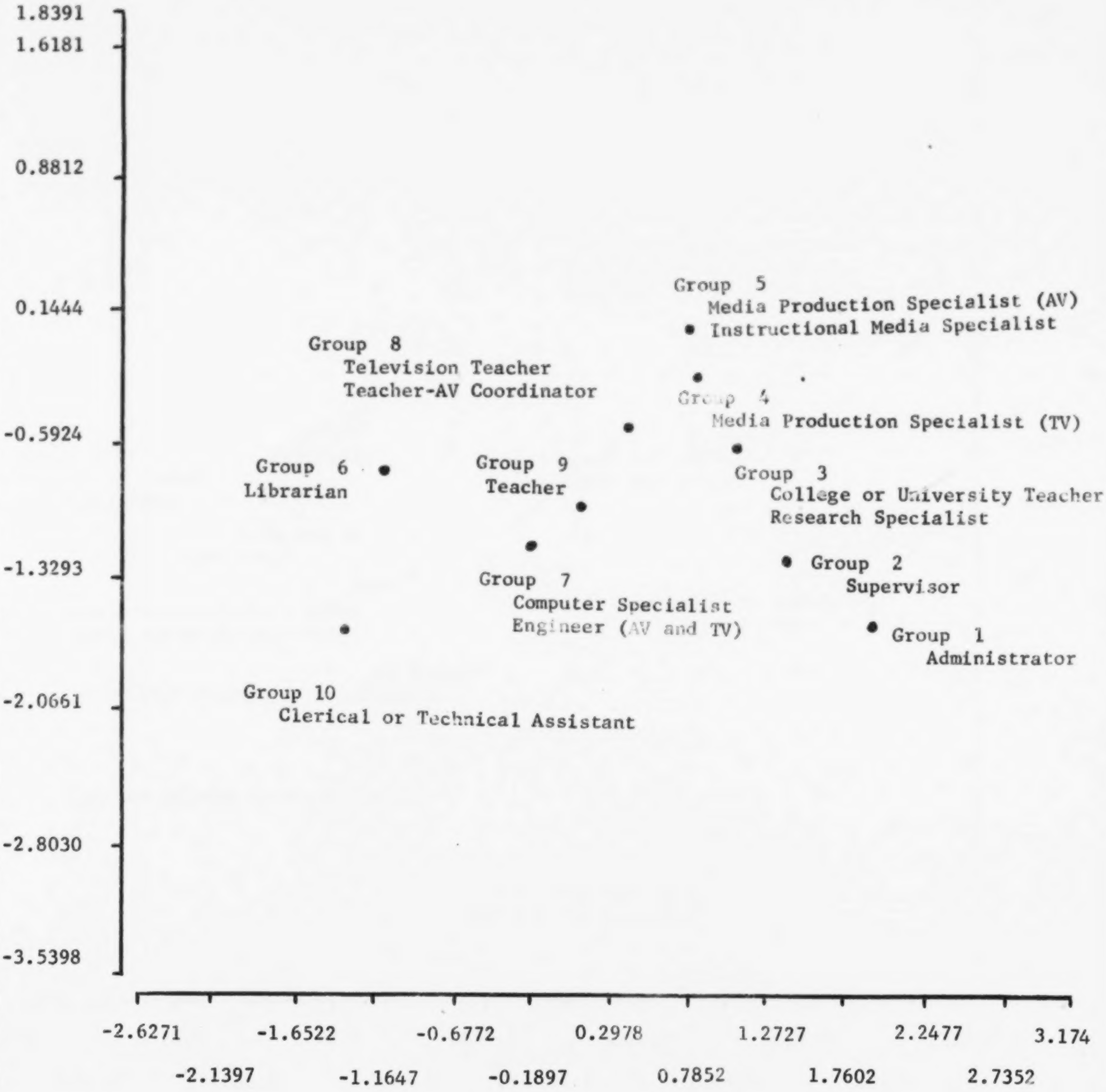


FIGURE 3. FJA DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 4

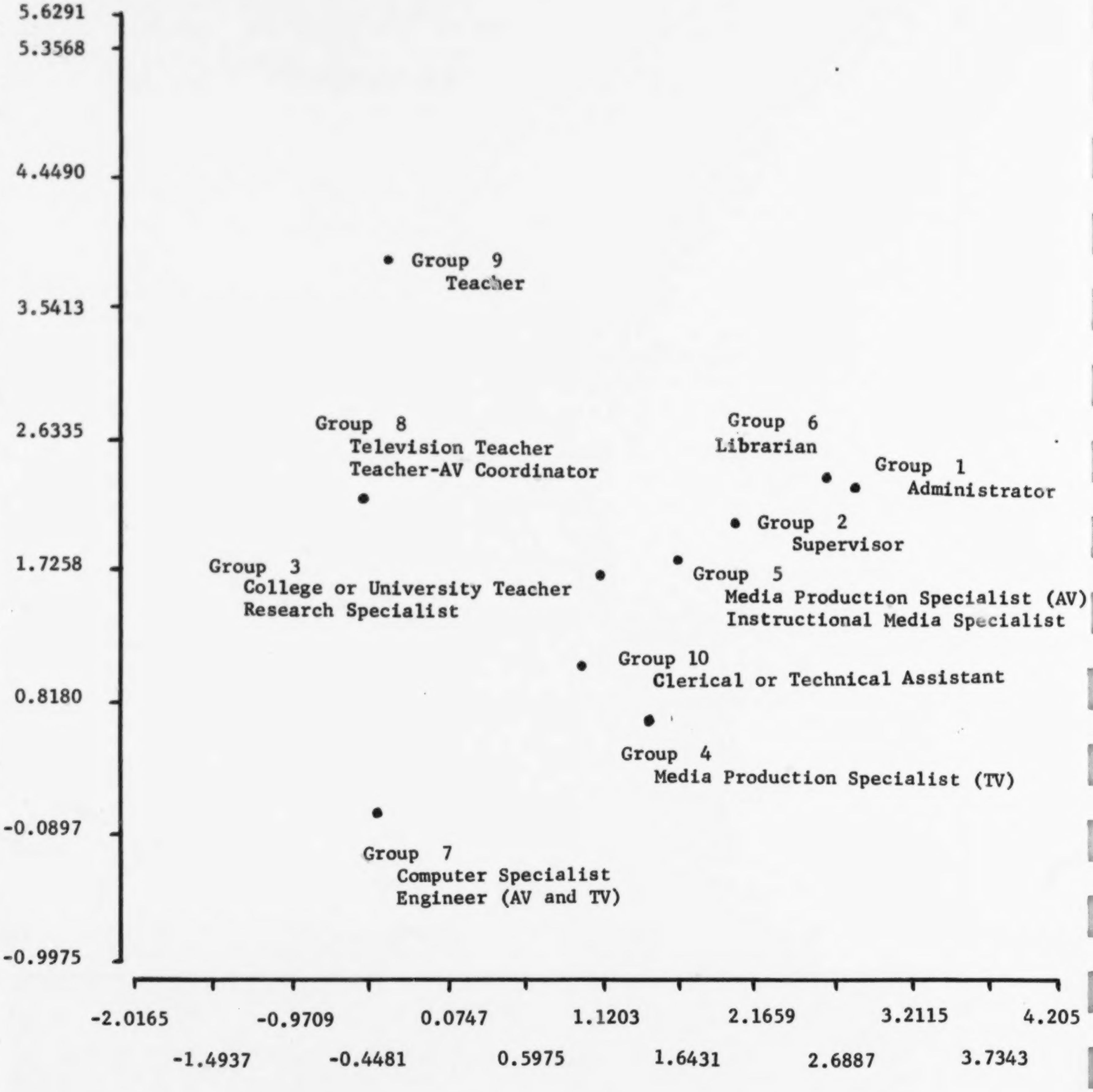


FIGURE 4. FJA DISCRIMINANT ANALYSIS: FUNCTION 2 vs. FUNCTION 3

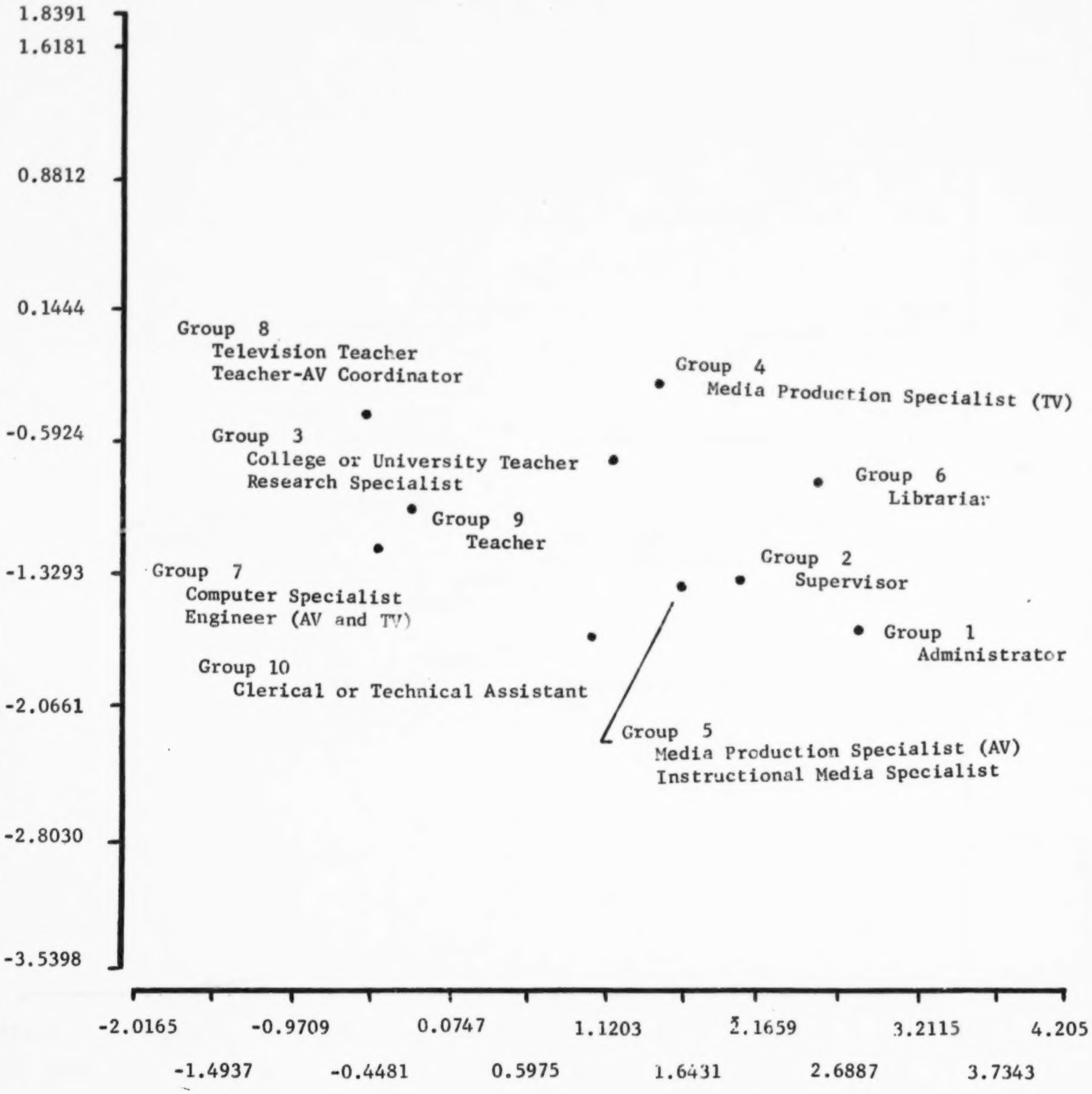


FIGURE 5. FJA DISCRIMINANT ANALYSIS: FUNCTION 2 vs. FUNCTION 4

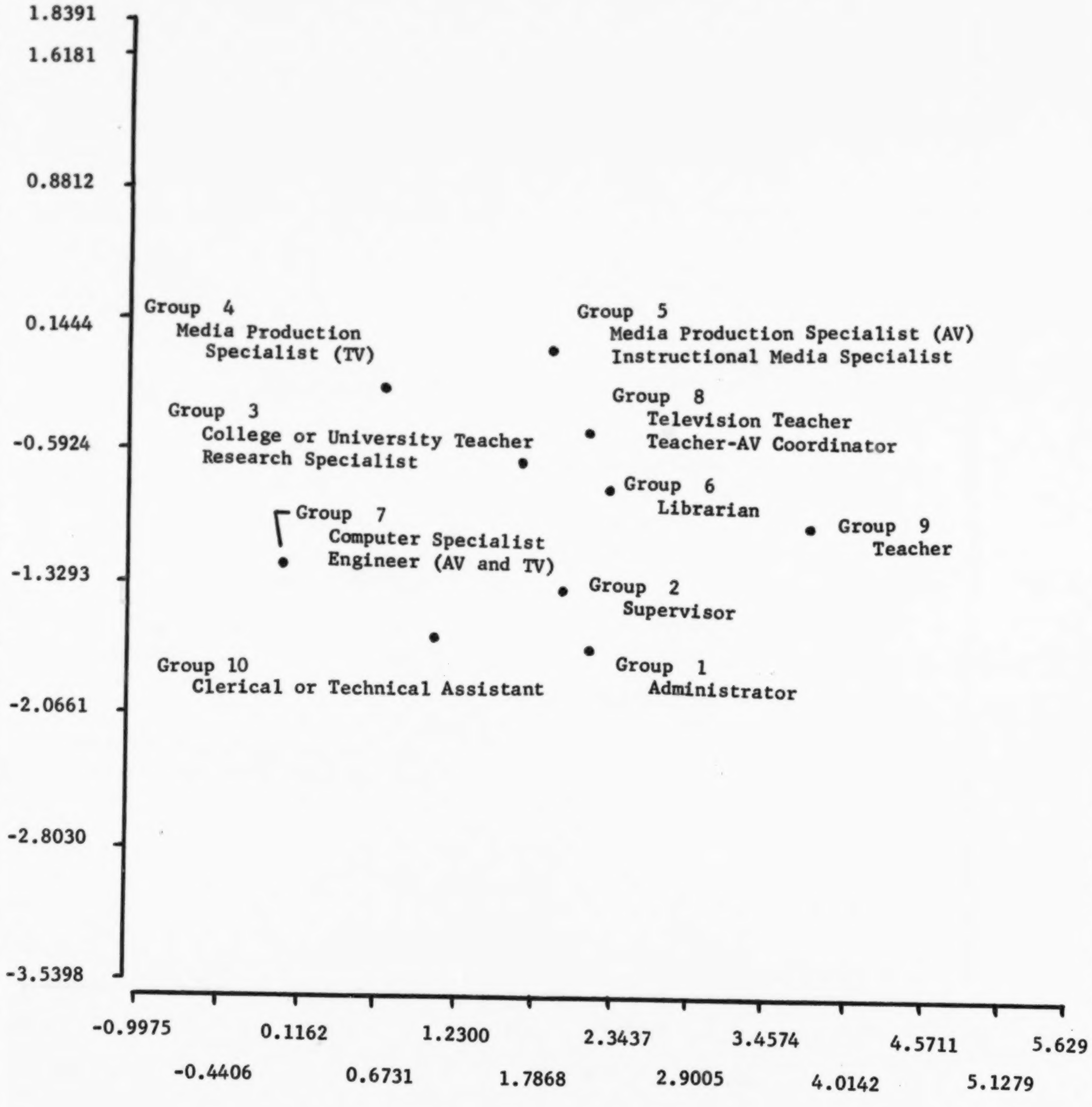


FIGURE 6. FJA DISCRIMINANT ANALYSIS: FUNCTION 3 vs. FUNCTION 4

Appendix I

SVIB ANALYSIS

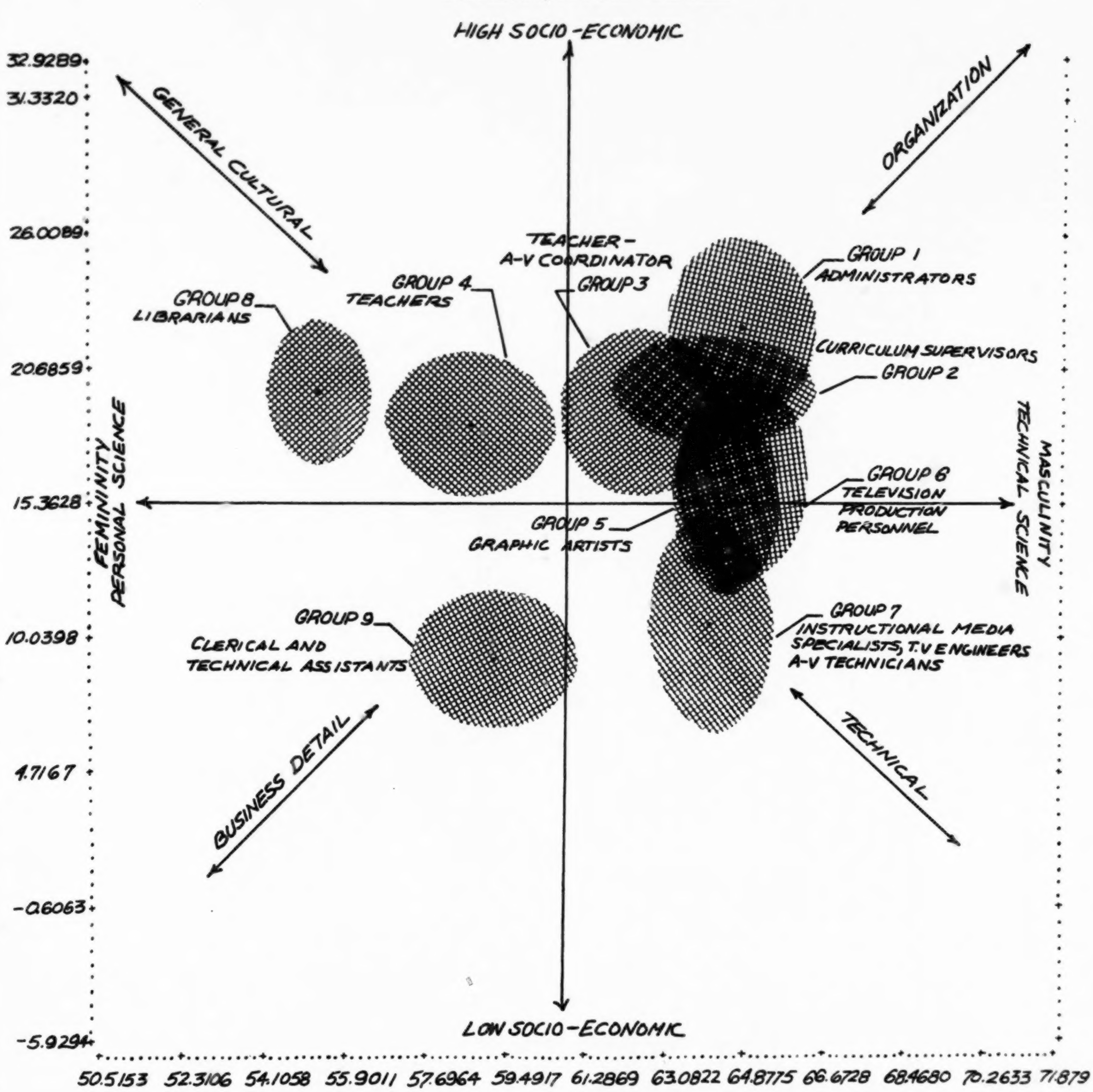
SVIB DISCRIMINANT ANALYSIS

TABLE 7 - STRONG VOCATIONAL INTEREST INVENTORY GROUP MEANS

Interest Variables	1 Admin.	2 Super.	3 Teach. AV Coord.	4 Teach.	5 Graphic Artists	6 TV Prod. Personnel	7 I.M.S.'s TV Engr. AV Tech.	8 Lib.	9 Clerical & Tech. Assts.
1 - Professional Status Interests	39.36	39.25	39.71	41.78	47.92	43.20	41.60	44.12	39.15
2 - Technical Science Interests	30.82	31.00	32.29	28.78	33.17	34.60	42.30	25.35	28.08
3 - Social Service Interests	48.27	48.25	49.95	46.17	39.50	43.00	35.40	36.65	42.77
4 - Business Detail Interests	28.27	30.08	29.71	28.87	24.75	30.10	31.40	30.71	40.00
5 - Business Contact (Sales) Interests	38.91	38.92	34.95	38.43	37.67	38.10	33.00	38.71	39.08
6 - Specialization Interests	53.45	50.08	47.52	48.22	45.50	48.10	41.60	48.47	40.00
7 - Maturity of Interests	56.64	56.50	57.48	55.04	50.33	54.60	50.20	56.59	54.15
8 - Occupational Level Interests	61.64	59.42	55.24	58.61	58.92	58.50	54.90	62.41	54.85
9 - Masculinity-Femininity of Interests	40.55	39.83	40.24	29.30	37.00	41.40	48.60	20.18	33.08

TABLE 8 - SCALED VECTORS - SVIB DATA

Variables	I	II	F Ratio	P
1	0.52	-0.38	1.05	0.40
2	-0.39	-0.39	1.98	0.054
3	0.10	0.12	3.05	0.0037
4	0.08	-0.55	1.88	0.069
5	0.11	-0.35	0.81	0.59
6	0.02	0.19	2.92	0.0053
7	-0.03	0.19	2.30	0.025
8	0.15	0.43	2.66	0.010
9	0.72	0.12	7.44	$.24 \times 10^{-6}$



STRONG VOCATIONAL INTEREST SCORES

FIGURE 2

Appendix J

SVIB DISCRIMINANT ANALYSIS PLOTS

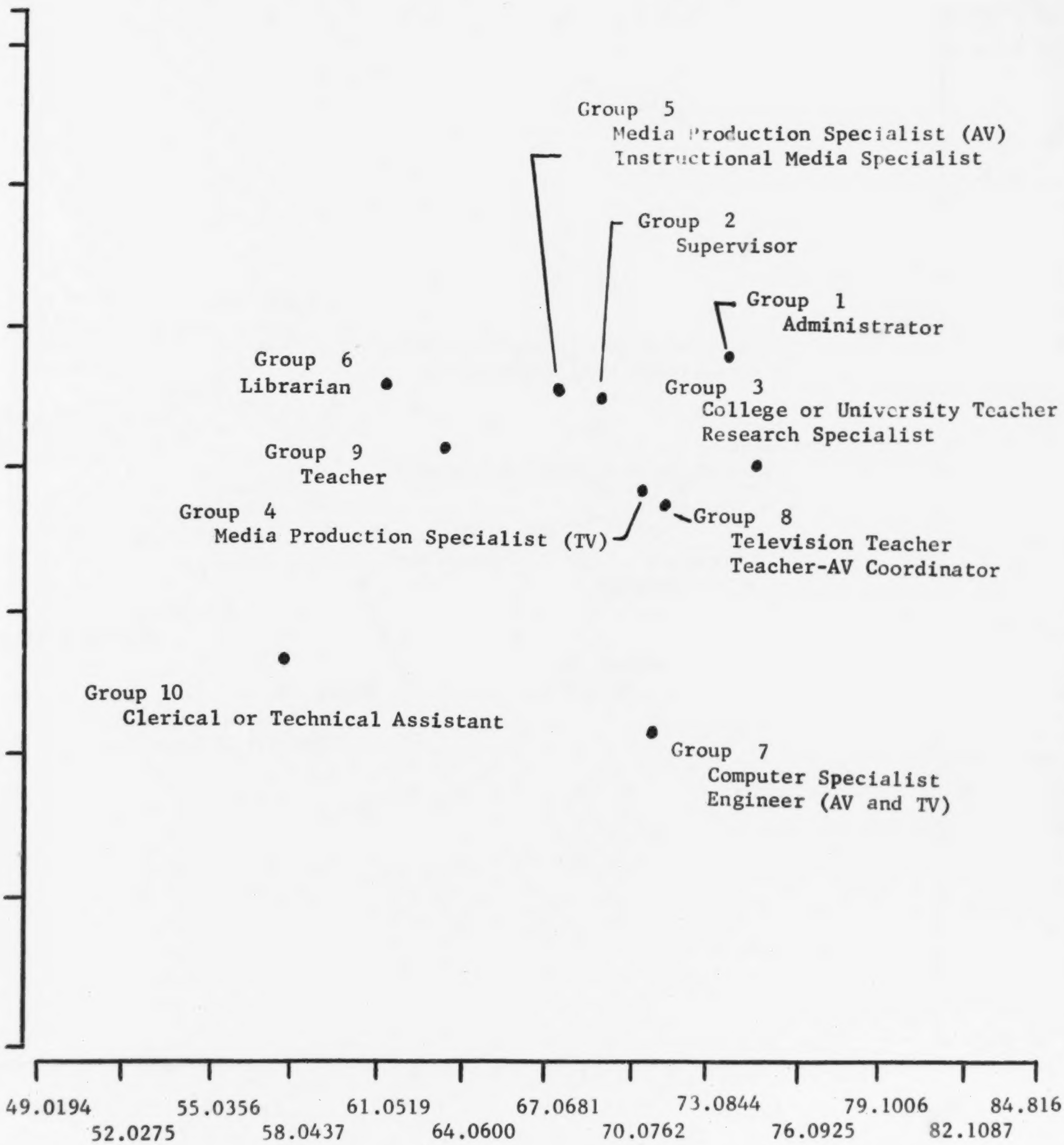


FIGURE 13. SVIB DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 2.

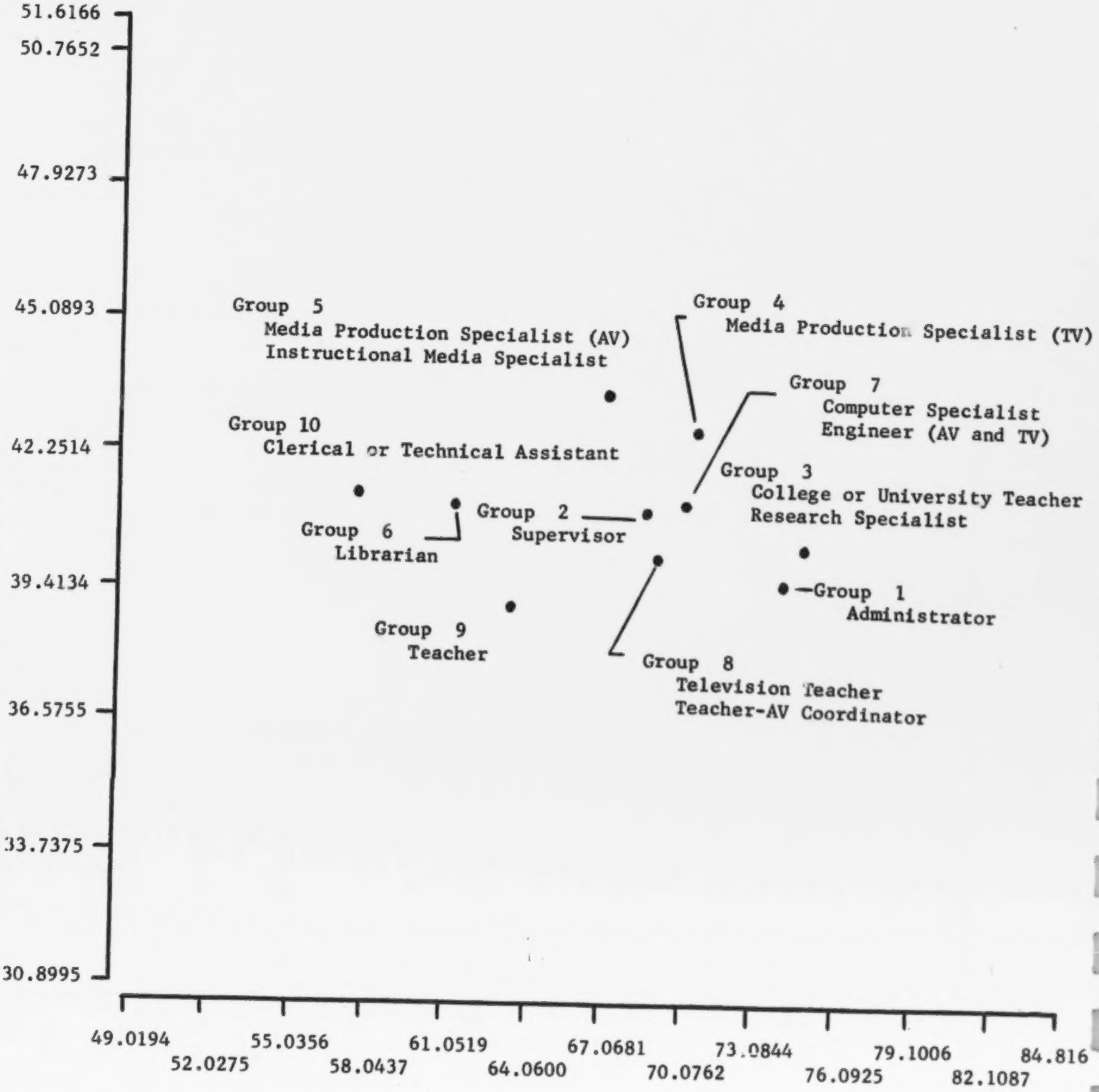


FIGURE 14. SVIB DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 3.

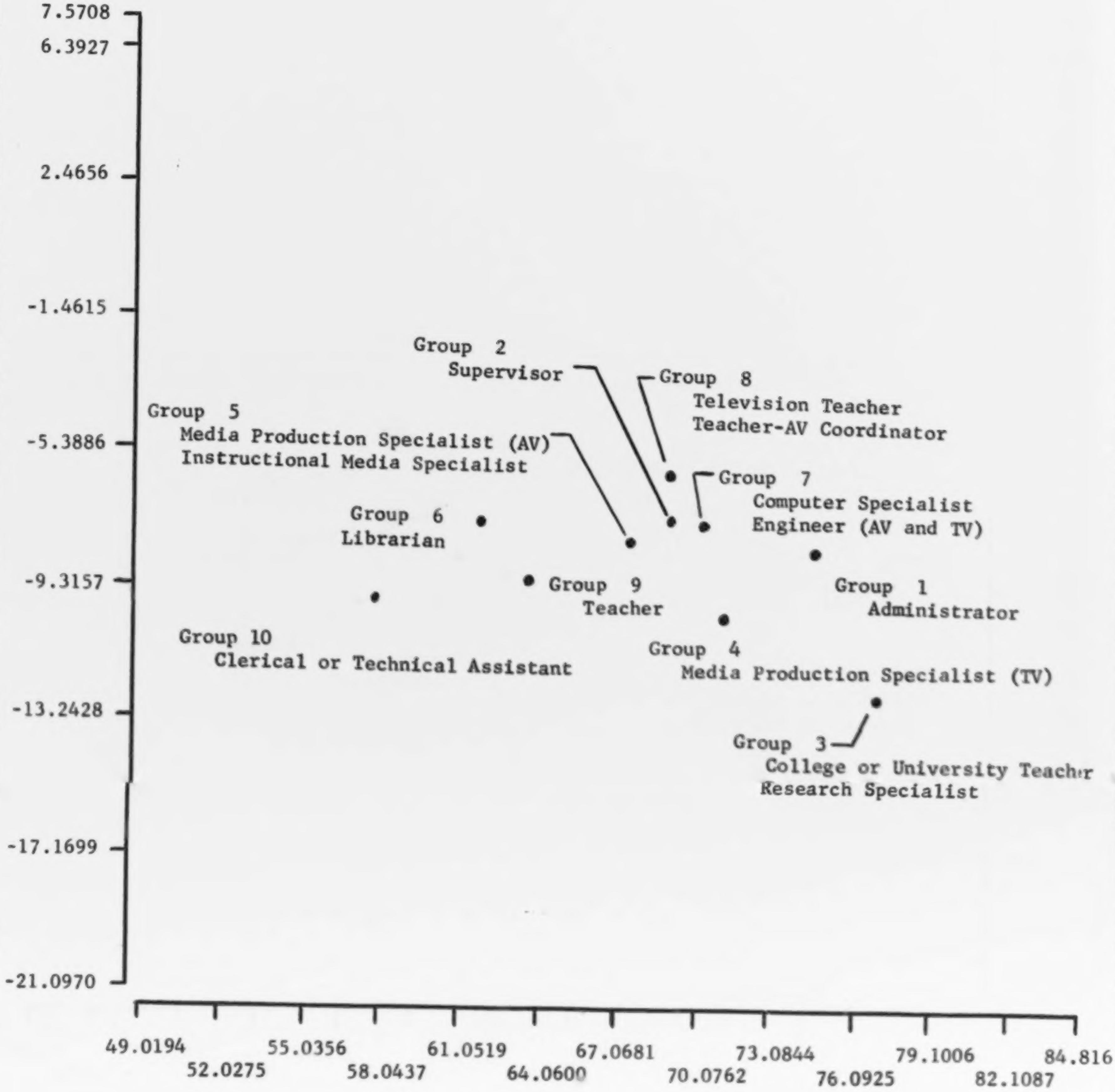


FIGURE 15. SVIB DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 4.

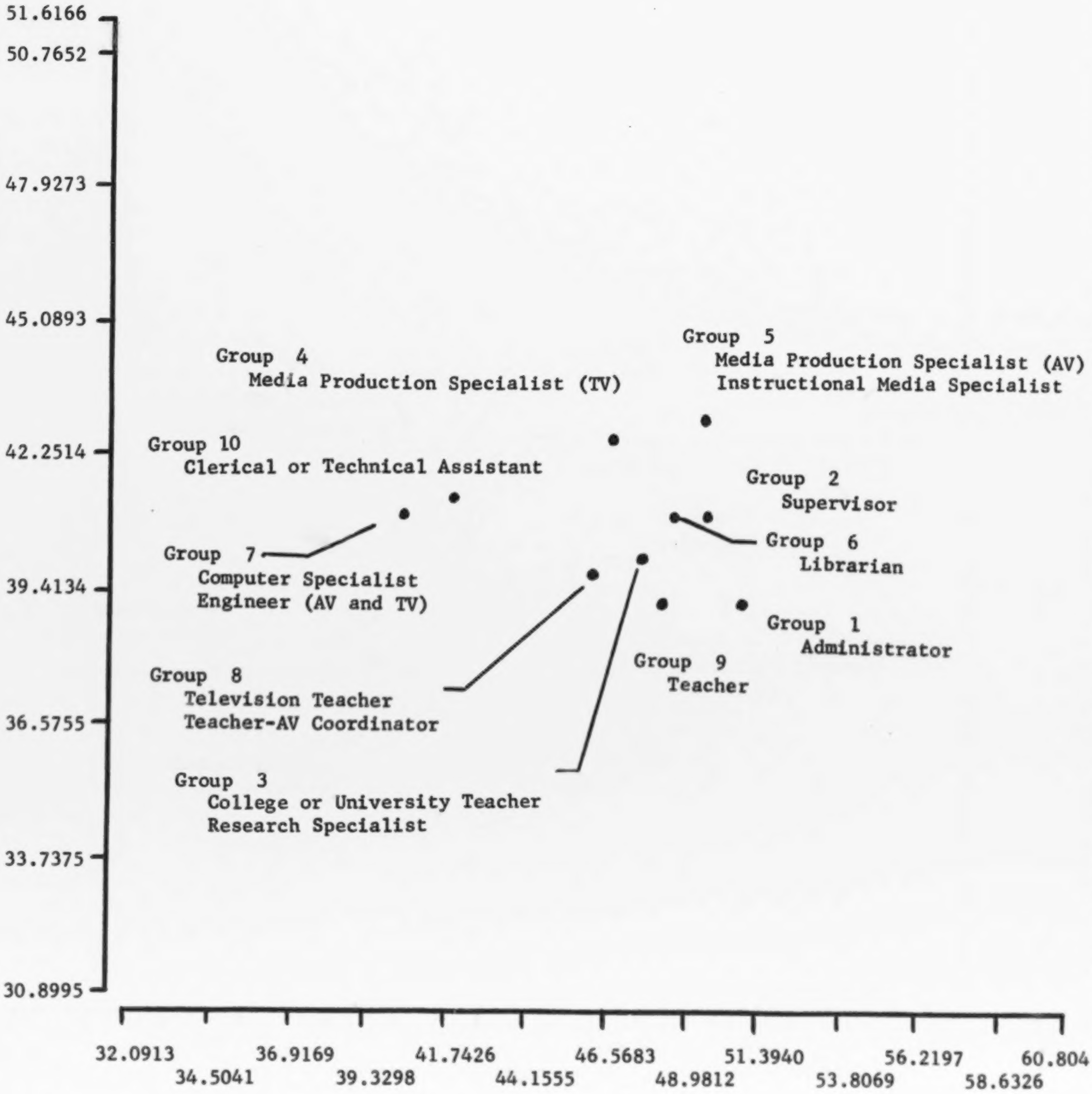


FIGURE 16. SVIB DISCRIMINANT ANALYSIS: FUNCTION 2 vs. FUNCTION 3.

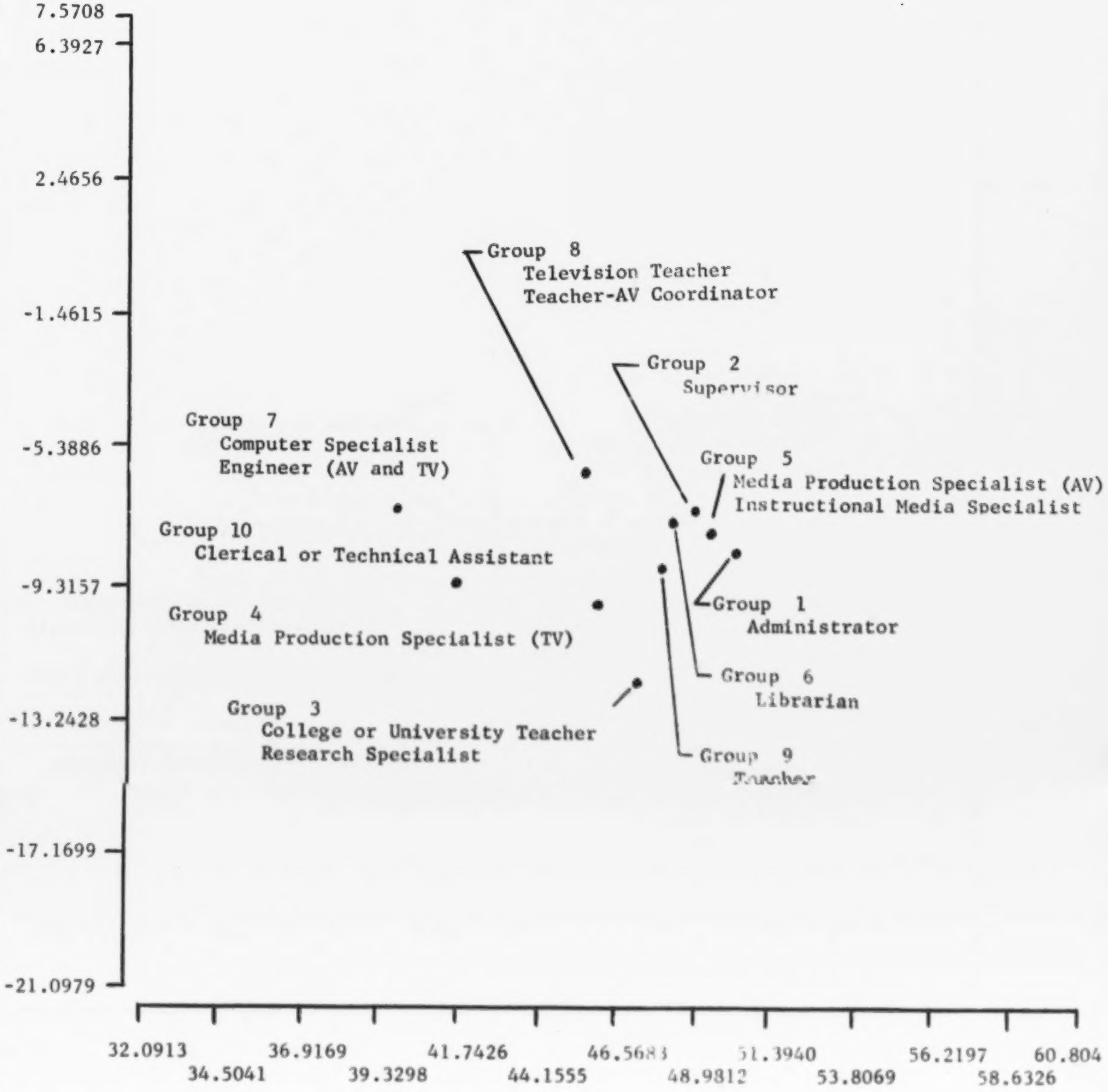


FIGURE 17. SVIB DISCRIMINANT ANALYSIS: FUNCTION 2 vs. FUNCTION 4.

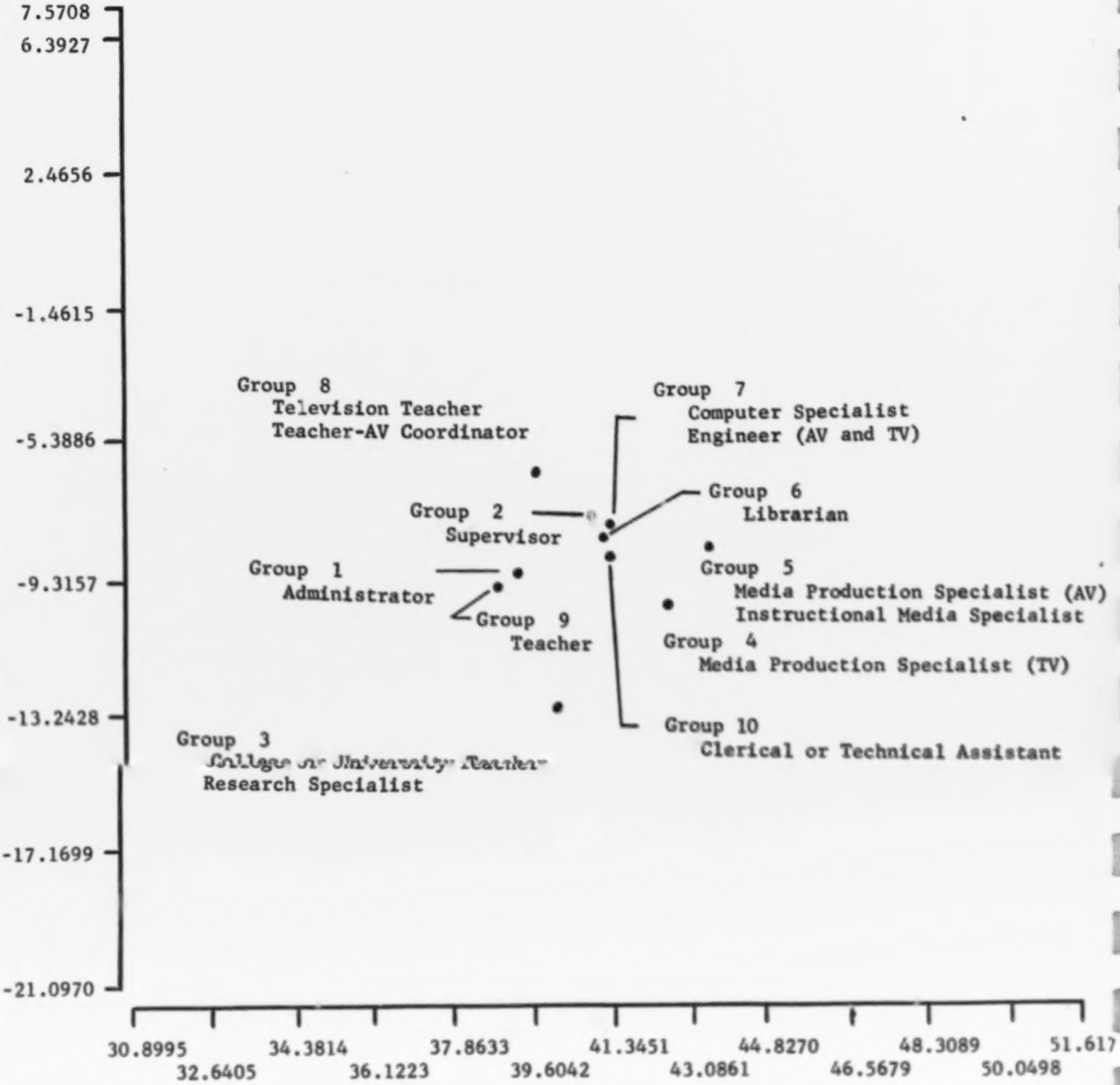


FIGURE 18. SVIB DISCRIMINANT ANALYSIS: FUNCTION 3 vs. FUNCTION 4.

Appendix K

JOB INCENTIVE DISCRIMINANT ANALYSIS PLOTS

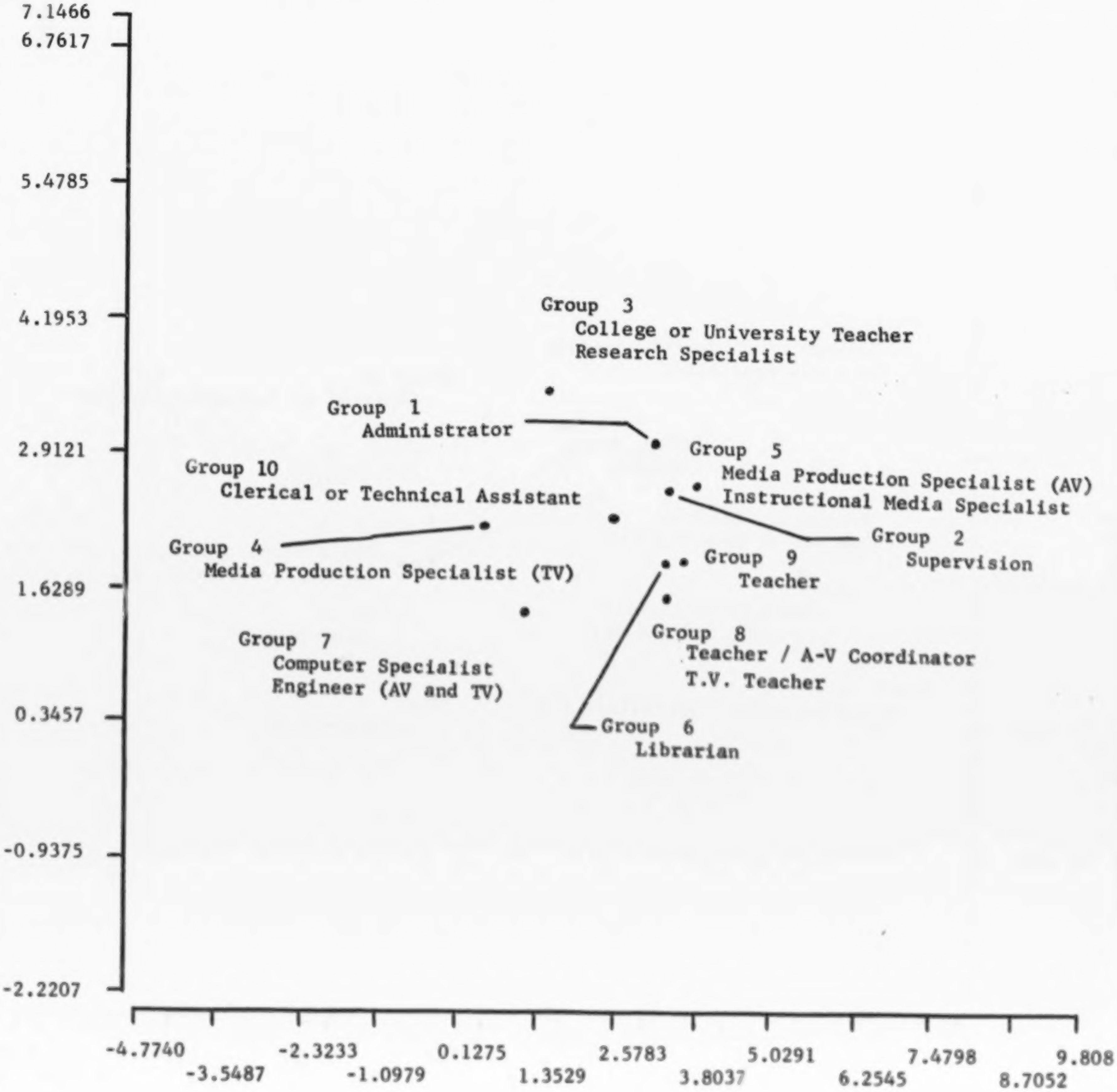


FIGURE 7. JOB SATISFACTION DISCRIMINANT ANALYSES: FUNCTION 1 vs. FUNCTION 2

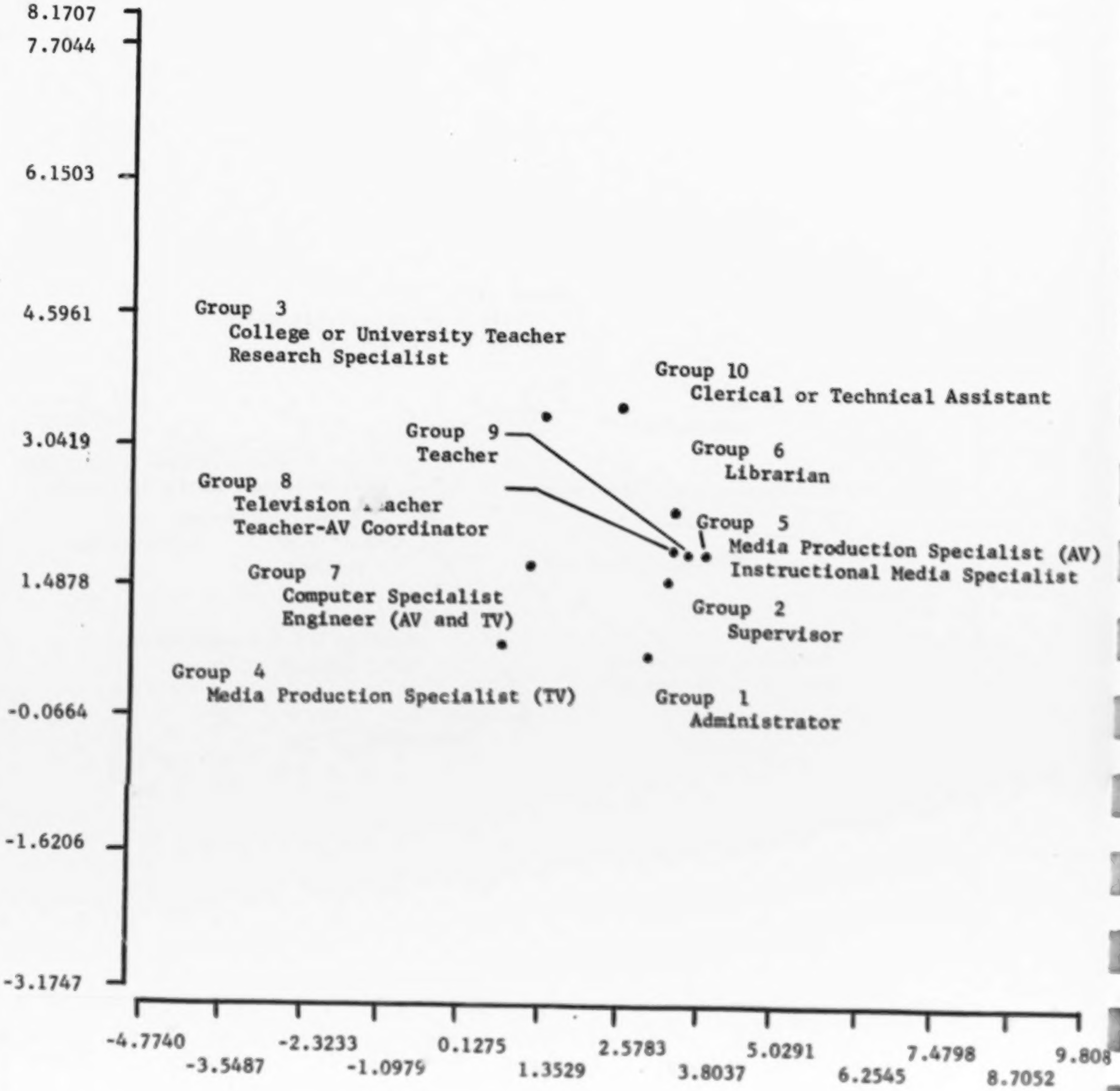


FIGURE 8. JOB SATISFACTION DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 3

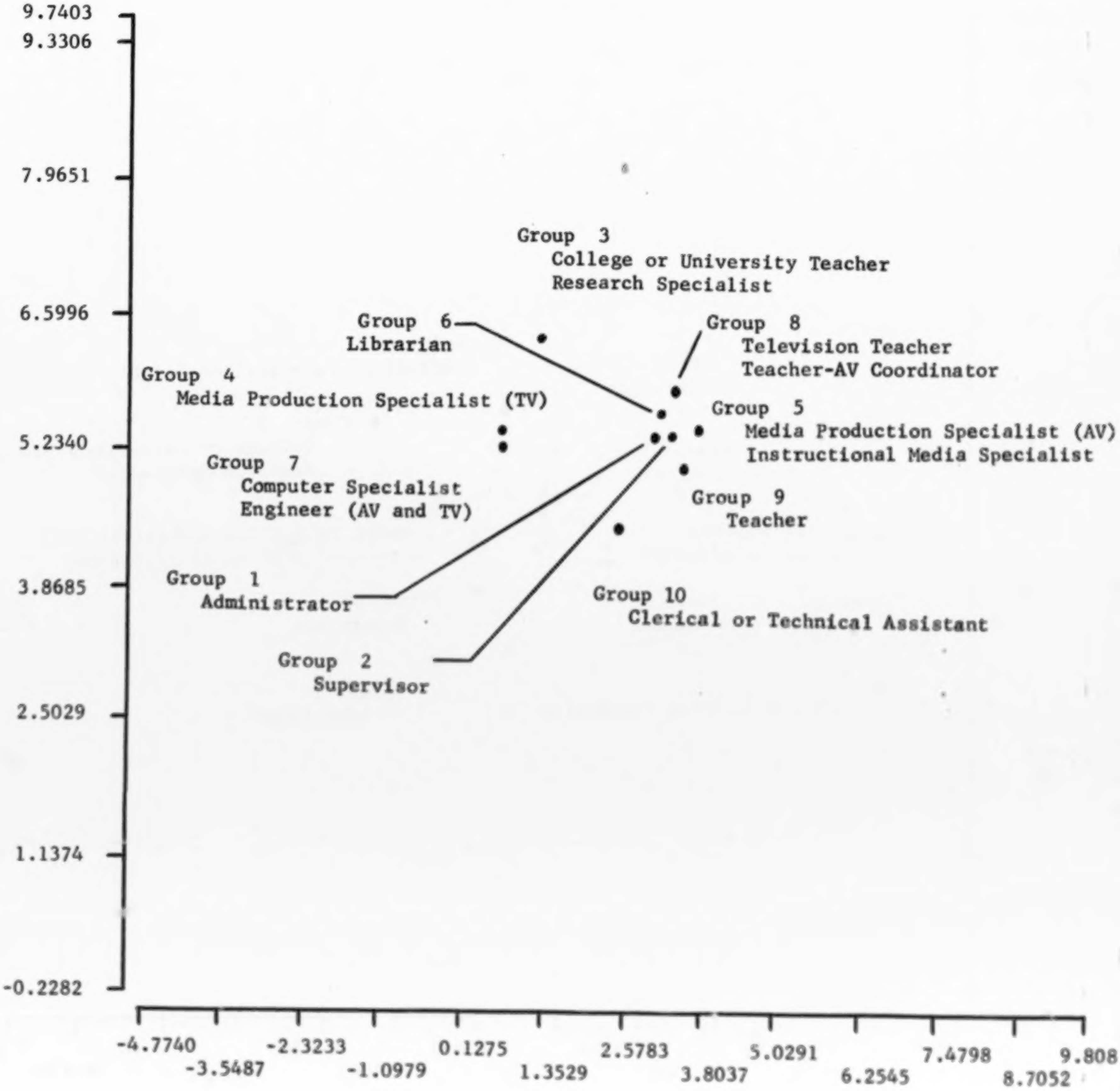


FIGURE 9. JOB SATISFACTION DISCRIMINANT ANALYSIS: FUNCTION 1 vs. FUNCTION 4

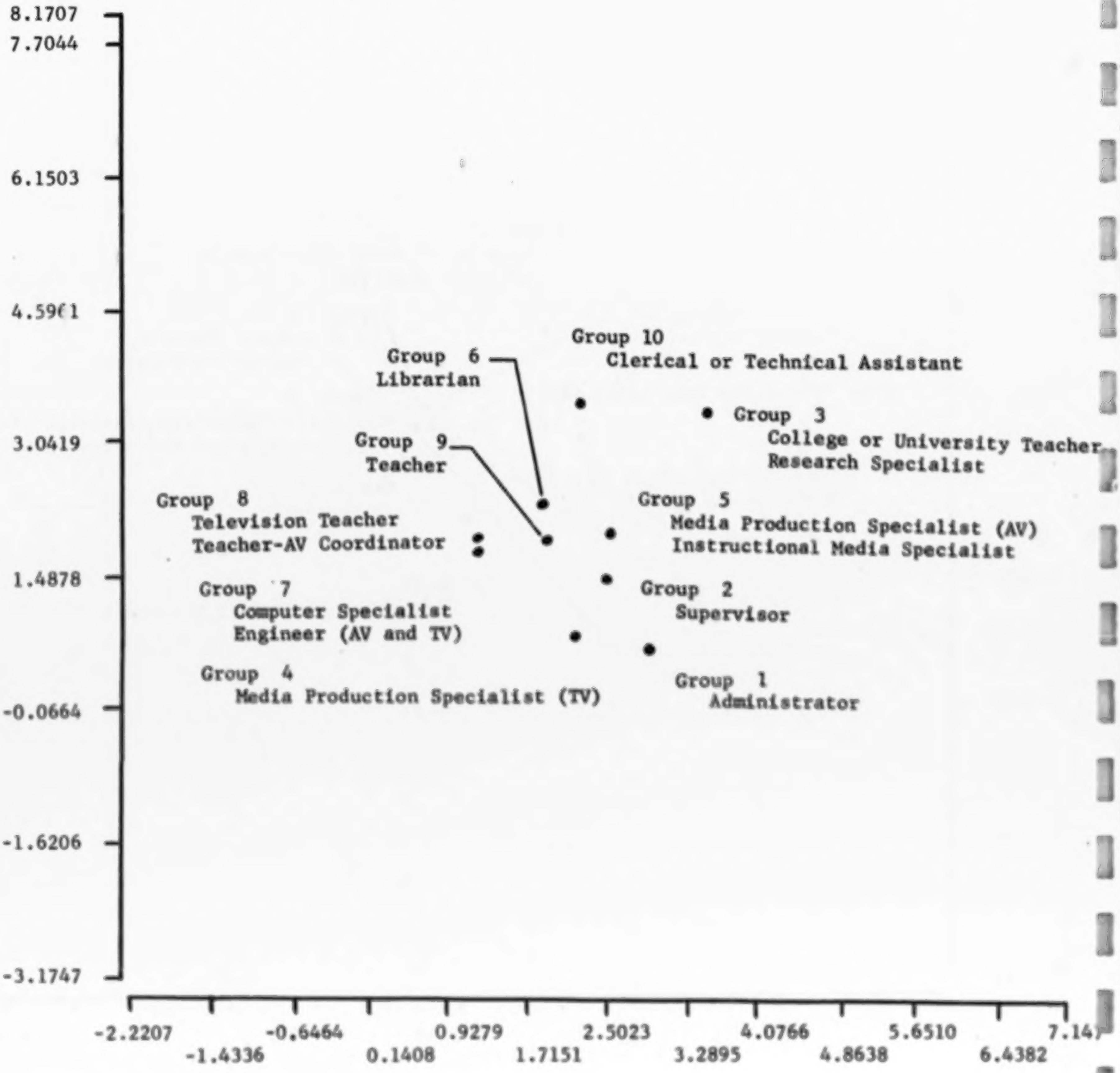


FIGURE 10. JOB SATISFACTION DISCRIMINANT ANALYSIS: FUNCTION 2 vs. FUNCTION 3

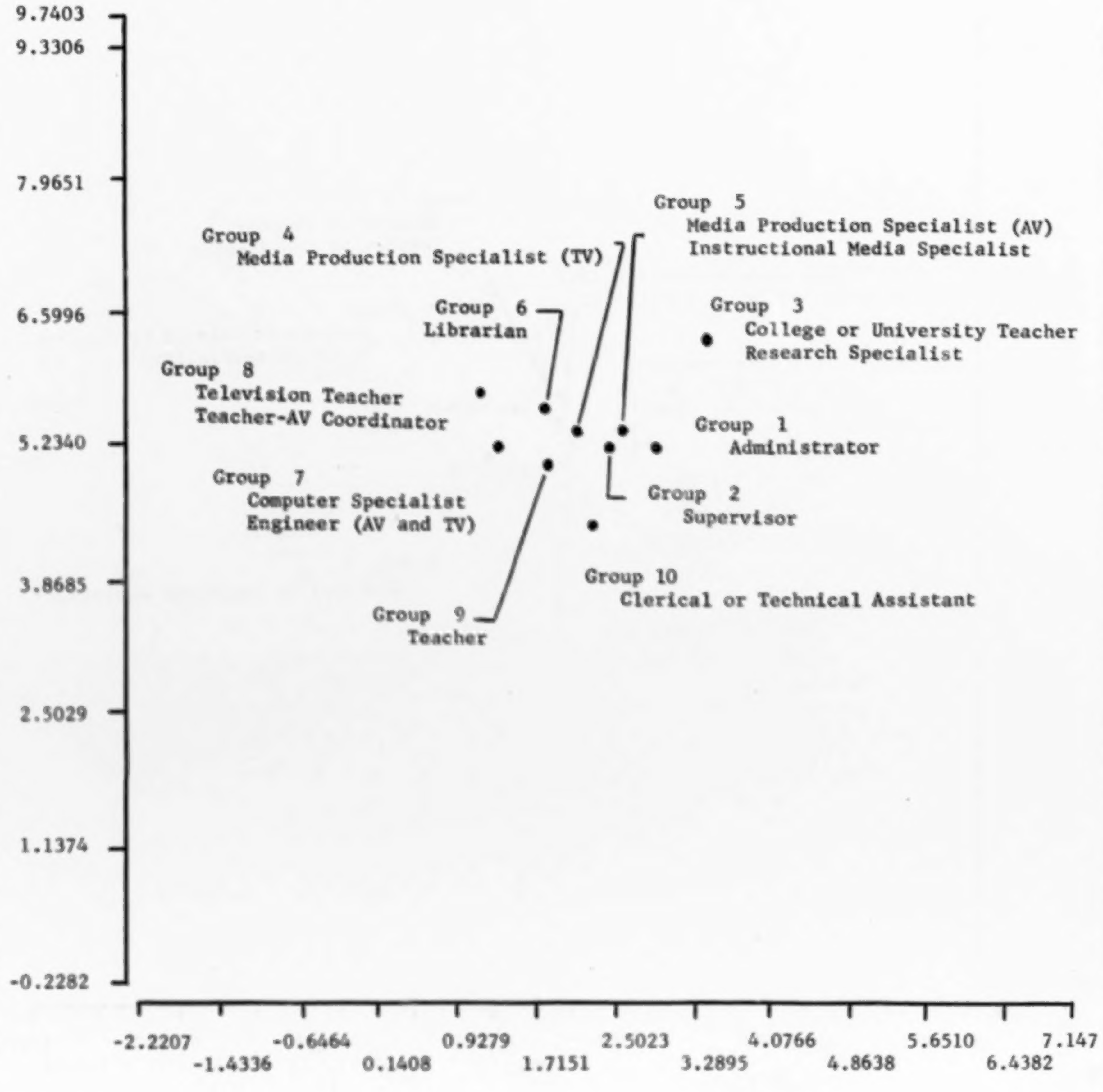


FIGURE 11. JOB SATISFACTION DISCRIMINANT ANALYSIS: FUNCTION 2 vs. FUNCTION 4

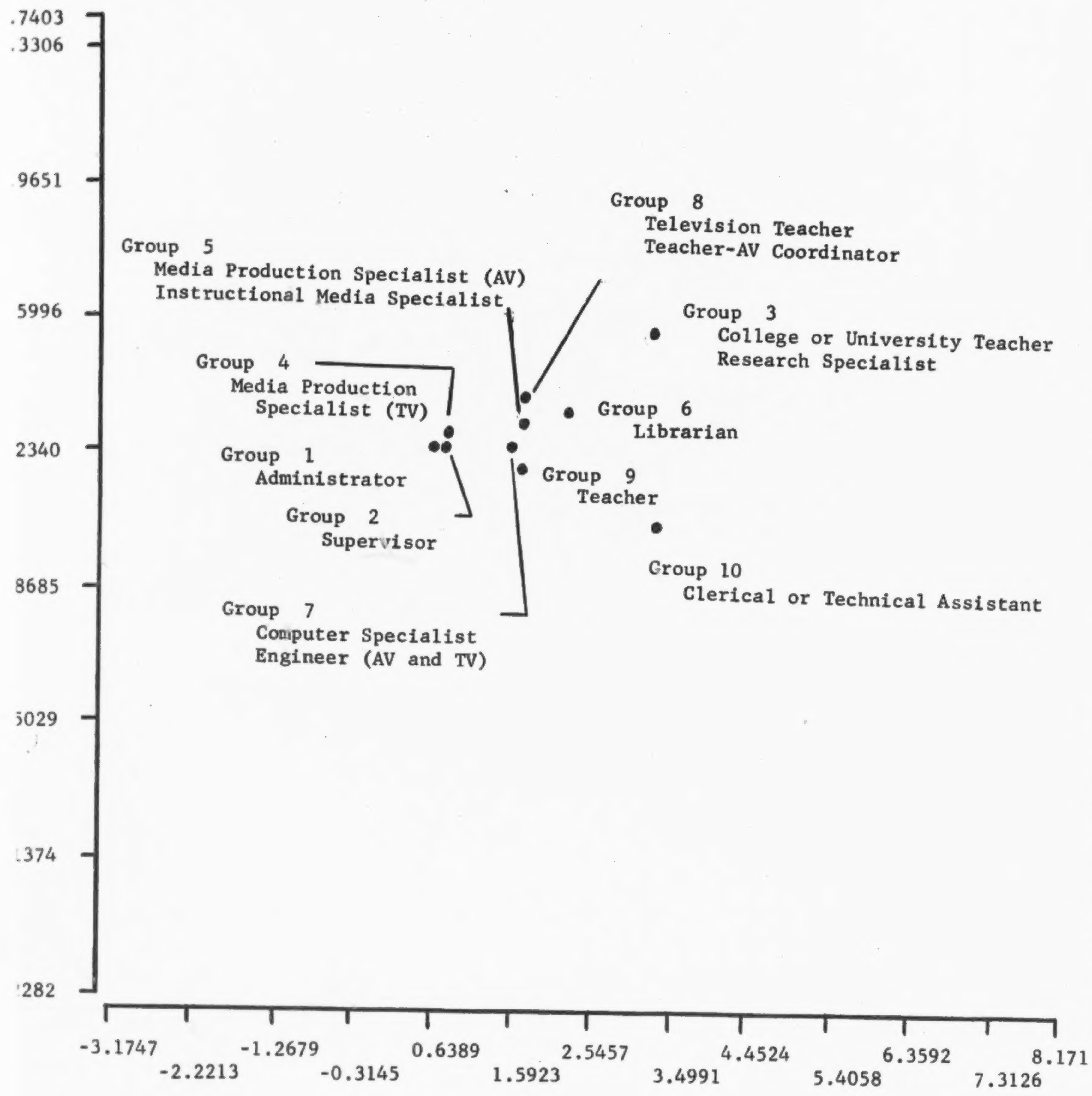


FIGURE 12. JOB SATISFACTION DISCRIMINANT ANALYSIS: FUNCTION 3 vs. FUNCTION 4